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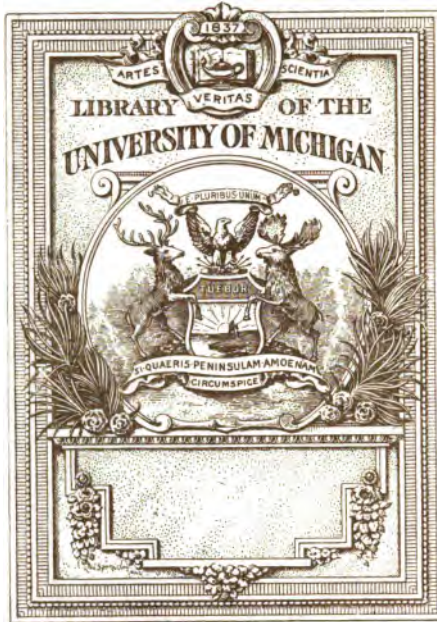
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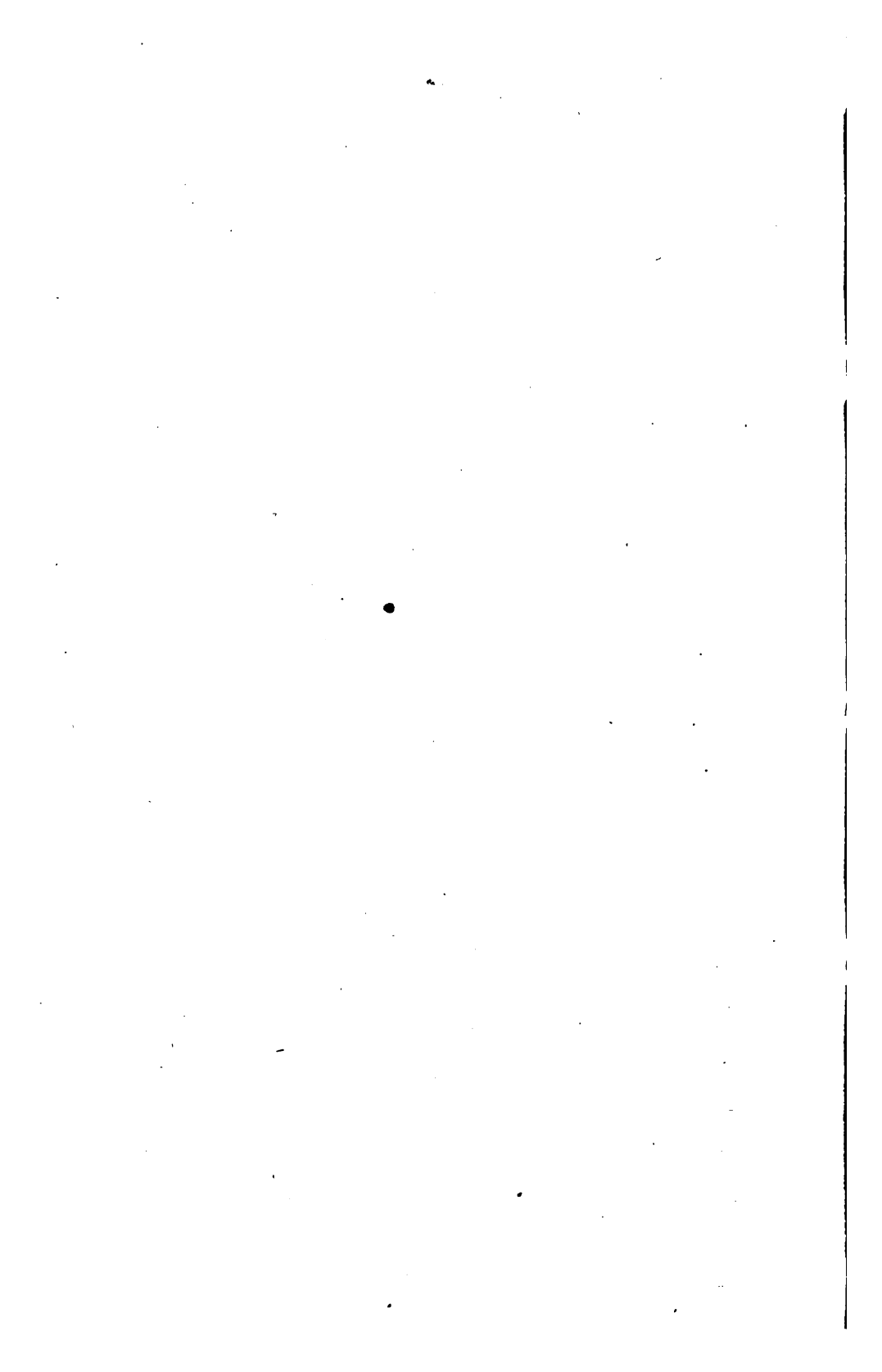
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THE GIFT OF  
*Oregon State Board  
of Horticulture*

SB  
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0712



SECOND BIENNIAL REPORT

74

OF THE

OREGON

STATE BOARD OF HORTICULTURE

TO THE

Legislative Assembly, Seventeenth Regular Session.

ALSO APPENDIX TO THE ORGANIZATION AND WORK OF THE OREGON  
STATE HORTICULTURAL SOCIETY.

PUBLISHED BY AUTHORITY.

1893.



SALEM, OREGON:  
FRANK C. BAKER, STATE PRINTER.  
1893.

## OFFICERS OF THE BOARD.

<b>DR. J. R. CARDWELL,</b>	-	-	-	-	-	-	-	-	-	-	<b>PRESIDENT</b>
<b>HENRY E. DOSCH,</b>	-	-	-	-	-	-	-	-	-	-	<b>TREASURER</b>
<b>ETHAN W. ALLEN,</b>	-	-	-	-	-	-	-	-	-	-	<b>SECRETARY</b>

OFFICE 272½ STARK STREET, PORTLAND.

## BOARD OF COMMISSIONERS.

	<b>STATE AT LARGE.</b>		
<b>J. R. CARDWELL,</b>	-	-	PORTLAND
	<b>FIRST DISTRICT.</b>		
<b>HENRY E. DOSCH,</b>	·	-	HILLSDALE
	·	-	-
	·	-	-
	·	-	-
	<b>SECOND DISTRICT.</b>		
<b>R. D. ALLEN,</b>	-	-	SILVERTON
	<b>THIRD DISTRICT.</b>		
<b>J. D. WHITMAN,</b>	-	-	MEDFORD
	<b>FOURTH DISTRICT.</b>		
<b>C. P. HEALD,</b>	-	-	HOOD RIVER
	<b>FIFTH DISTRICT.</b>		
<b>JAMES HENDERSHOTT,</b>	-	-	COVE

## DISTRICT BOUNDARIES.

### FIRST DISTRICT.

Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook counties.

### SECOND DISTRICT.

Marion, Polk, Benton, Linn, and Lane counties.

### THIRD DISTRICT.

Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake counties.

### FOURTH DISTRICT.

Morrow, Wasco, Gilliam, Crook, and Sherman counties.

### FIFTH DISTRICT.

Umatilla, Union, Baker, Wallowa, Malheur, Grant, and Harney counties.

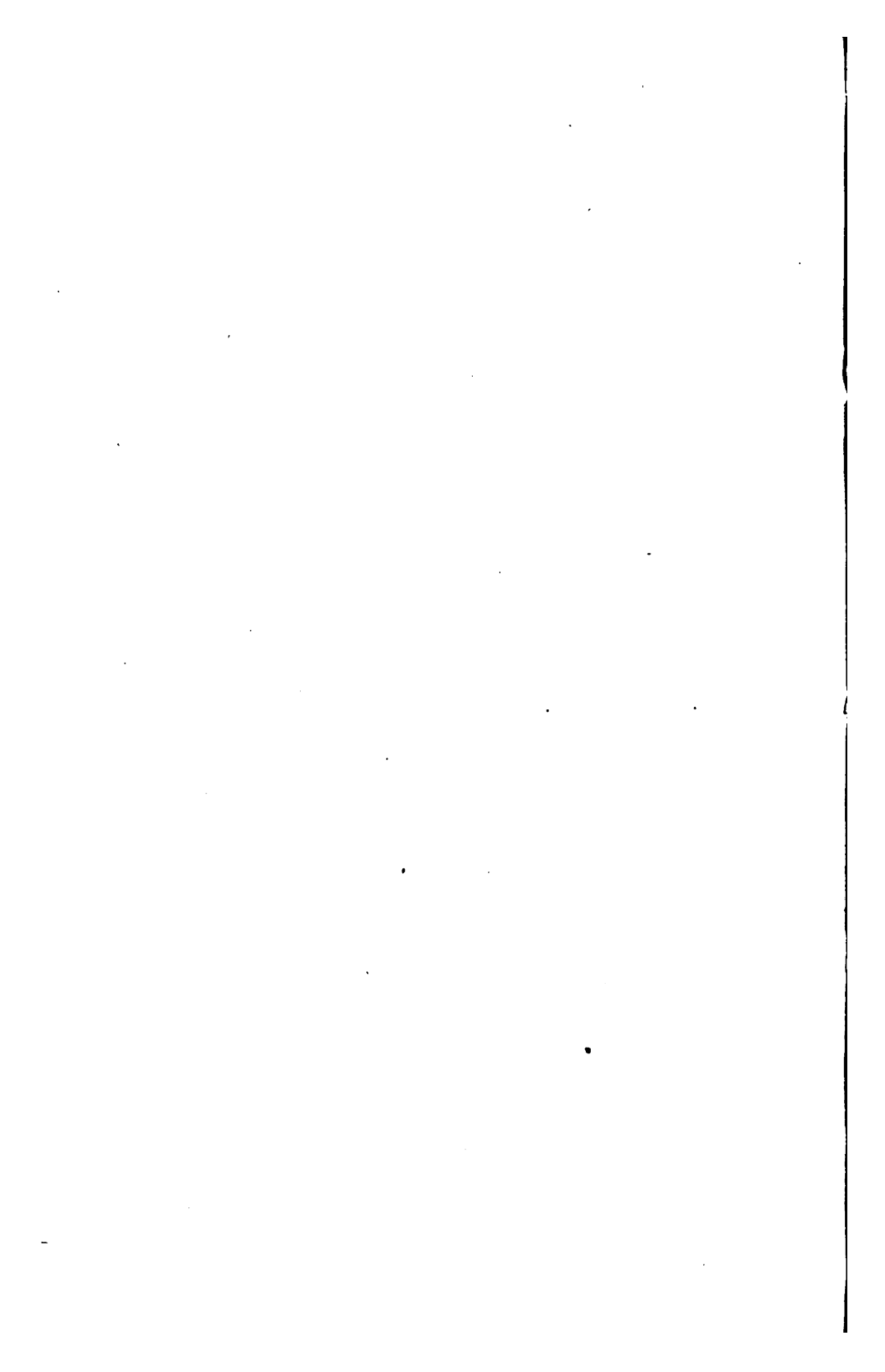
## TO THE FRUIT GROWER.

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This report is sent to you with the compliments of the Board, trusting you may find something of personal interest to you.

For further information kindly address the Commissioner of your district, who will cheerfully answer all communications appertaining to horticultural matters, and who will also visit you, and neighbors, if you so desire.

The Commissioner of your district will deem it a special favor if you will inform him of any *orchards* in your neighborhood which are infected, and the owners thereof be counselled with, in order to cleanse and eradicate any insects on their premises.







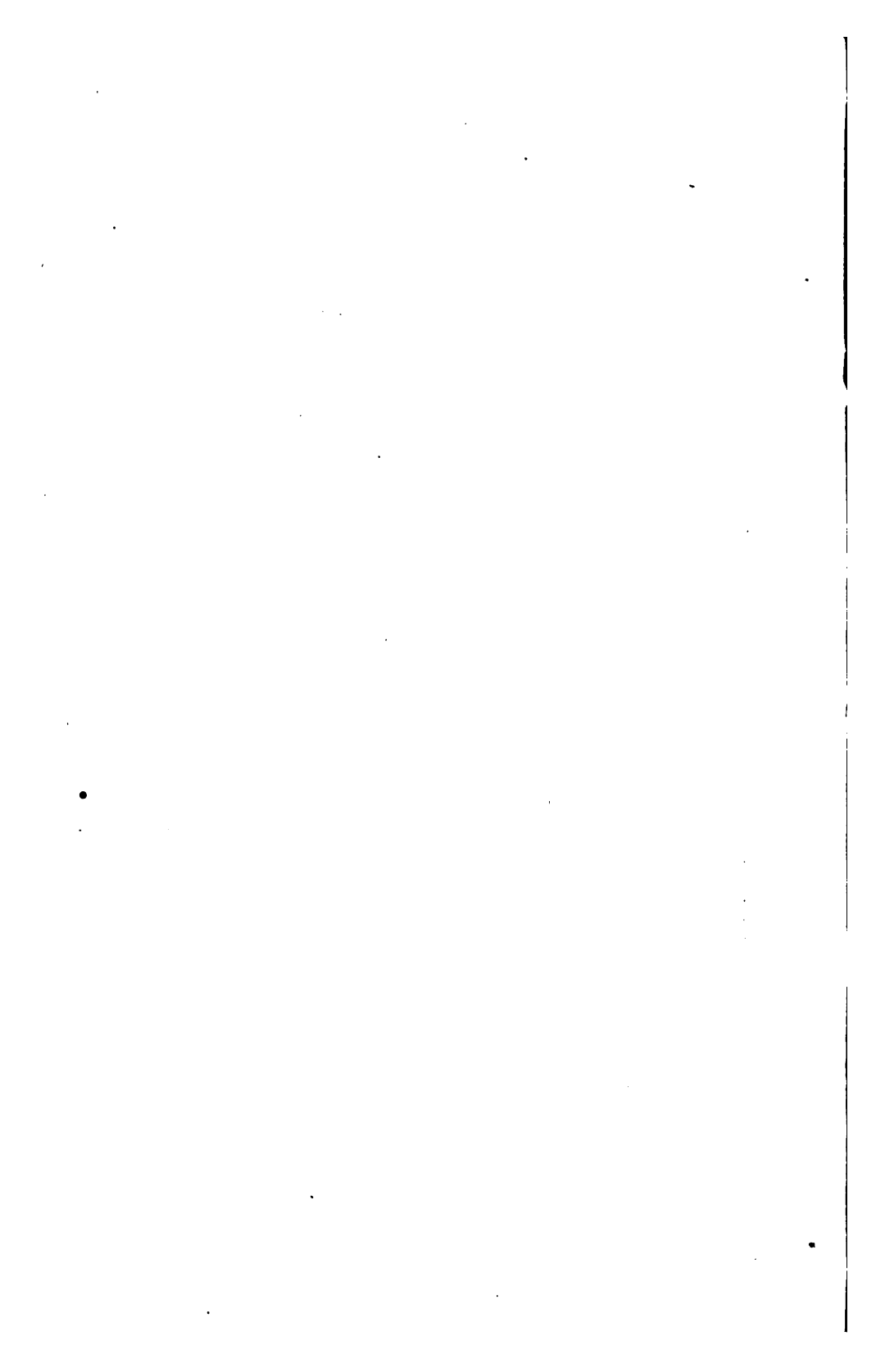
*R. S. WALLACE.*

40

## RESOLUTIONS OF RESPECT.

Whereas, the strong arm of that mighty conqueror of all that is earthly, the Reaper Death, has again manifested his power in removing from us, while in the prime of life and in the midst of a most valuable and vigorous public career, our highly esteemed friend and associate, R. S. WALLACE; and, whereas, the sudden termination of a life so valuable to his family, his neighbors and the State at large, brings us to realize in the most forcible manner the uncertainties of life even while in its vigor and prime; and, whereas, in the death of Commissioner R. S. WALLACE, the Oregon State Board of Horticulture has lost a most efficient and valuable member, and the State at large a most enterprising and public-spirited citizen, and his family a tender husband and loving father; therefore, be it

*Resolved*, That this Board desires to express the deep feeling of profound regret that each member thereof feels at this sudden termination of so valuable and useful a life; and that we, the members of said Board, unite in an expression of sympathy to the wife and children of our esteemed associate, in this their hour of great sorrow.



# REPORT.

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*To the Honorable Senate and the House of Representatives of the Legislative Assembly of the State of Oregon:*

In accordance with an act creating the State Board of Horticulture, we respectfully submit for your consideration this, our second biennial report of the work accomplished by and under the auspices of this Board.

No more important subject will be brought to the attention of your honorable bodies than the fostering and protecting by judicious legislation the growing fruit industry, which, under proper protecting care, will soon be one of the most valuable to the citizen and to the commerce of the State of Oregon.

Four years of practical operation of the law under which the Board is working, has shown to us the defects therein, and what is needed to make it of practical value to perform the work assigned us to do. In fact, the needs of the present hour are such as could not have been foreseen by the framers of the original bill. The quarantine laws that have been established by our neighboring States are such that we must absolutely enact laws that will protect our own fruit industries, or we shall be literally overrun by pest-infected fruits and trees that will be shipped in upon us, simply because they can find no other markets open to them; and as self-preservation is the first law of nature, we trust that your honorable bodies will speedily adopt the laws which we herewith present for your consideration. These have been carefully prepared by a special committee of our Board, after a careful study of the laws of other States which are likely to affect our fruit interests.

As an indication of the necessity which confronts us for immediate legislative action in this direction, we herewith submit the following letter of Mr. W. E. Collins, secretary of the County Board of Horticultural Commissioners of San Bernardino County, California, addressed to the President of this Board. This is only one of the many similar letters received by the members and officers of the Board:—

“You are doubtless aware that California has been waging an active warfare against the introduction of the Peach Yellows. Our

Legislature, at its last session, passed an act empowering the State Quarantine Officer and the County Horticultural Commissioners to quarantine against diseases and insects. We have had one active season and barred thousands of trees; car after car has been held and destroyed or returned, and many were not started on their journey by orders being countermanded. We realize that next season your markets will be glutted with Eastern trees; and an attempt or series of attempts will be made to ship them in here as Oregon grown. We have always admitted trees from Oregon as those grown in different parts of California, in some instances more freely. But there is a feeling growing daily stronger that unless your State takes active measures to protect yourselves against Eastern trees, in self-defense we will have, in California, to take precautionary measures against Eastern trees coming by way of your State. You are doubtless aware of the extent of country now devastated by the Yellows and Rosette. (See Dr. Smith's report and bulletin issued by the Agricultural Department, Washington, wherein he says our only safety lies in growing our own trees.) If either or both these deadly diseases once obtain a foothold on this coast, it is only a question of time when our peach, plum, prune, almond, nectarine, and other fruit trees on peach or plum root, will be wiped out. \* \* \* In my judgment, there is no subject of such preëminent importance to the vital interests of the fruit-growers of this coast, and they should stand shoulder to shoulder against the introduction of Eastern-grown trees for fear of getting these dread diseases with them."

We also herewith present a brief summary of the expenditures of the moneys placed at the disposal of this Board, and which we can most truthfully say have not been sufficient by several thousand dollars to enable the Board to effectively perform the work delegated to it. Our sister States, both north and south, have had much larger sums than has this Board, and have thereby been enabled to do more efficient and extensive work. The sum of six thousand dollars, asked by us to be appropriated for the use of this Board for each year's work, is based upon low estimates and in the strict line of economy, and we trust will be so considered by your honorable bodies.

Amount cash on hand in treasury December 31, 1890.....	\$ 1,251 18
Amount of appropriation, 1891.....	3,500 00
Amount of appropriation, 1892.....	3,500 00
Total amount received.....	<u>\$ 8,251 18</u>
Amount expended by commissioner at large.....	\$ 258 00
Amount expended by commissioner of first district.....	150 50
Amount expended by commissioner of second district.....	195 00
Amount expended by commissioner of third district.....	584 40
Amount expended by commissioner of fourth district.....	217 80

Amount expended by commissioner of fifth district.....	\$ 1,301 50
Amount salary and expenses of inspector fruit pests.....	1,462 00
Amount salary secretary two years.....	1,800 00
Amount office rent.....	560 00
Amount office fixtures.....	57 75
Amount paid for printing.....	1,276 00
Amount postage stamps.....	590 67
Amount paid subscription to papers.....	21 00
Amount paid for express and telegrams.....	33 35
Amount traveling expenses of secretary.....	31 00
<b>Total amount expended.....</b>	<b>\$ 8,488 97</b>
<b>Amount expended in excess of amount received.....</b>	<b>\$ 187 79</b>

The seemingly large expenditure for printing was made in response to an urgent demand. The bulletins and report of the Board being the first horticultural publication for distribution made in the State, were much sought and widely distributed abroad and at home. The ten thousand copies of the report printed by the Board, at its own expense, and in the city of Portland, will not more than suffice to meet this demand. The bulletins compiled from the Departments of Horticulture at Washington and the experimental stations of the different States have been in great request, and distributed, as we believe, with very satisfactory results to the fruit-growers. The Board realize that a most important branch of its work is in this line, and that a wide distribution of a reliable literature on the growing fruit industry of Oregon would be of incalculable benefit in developing a great fruit industry commensurate with the fruit-growing capacity of the State. The numerous inquiries from abroad and the voluminous correspondence of our Secretary and the members of the Board, is evidence of a growing interest in this direction. The daily call for facts and figures and reliable information; the coming of fruit-growers with advanced ideas; the purchase of large bodies of fruit lands by individuals and companies, and the setting of large commercial orchards over the State, all bespeak the importance and continued prosperity of this great industry. Thousands of acres are being set to the apple, pear, cherry, prune, peach, and other fruit suitable to our soil and climate, and we now estimate one hundred thousand acres set to these fruits rapidly increasing in area, which must soon bring in a large revenue. This, in a country unrivaled for the growth and perfection of these fruits, promises much for the future. And yet we may say that so far as to our capacities, commercially considered, we are only in the beginning.

In this connection, it is pertinent to note that in transportation facilities we have four transcontinental railroads, the great Columbia River, and the ocean highways; and, may we not say, prospects of the Nicaragua Canal in the near future. Thus fortunately situ-

ated, we shall be enabled to ship cheaply our green, dried, and canned fruits to the markets of the world.

In these respects we are exceptionally favorably situated, and may successfully compete in the markets. The possibilities of this trade grow upon us in magnitude, and are beyond calculation. Our California neighbors are alive to the situation, and are preparing to reap a golden harvest. In the fruit products adapted to our soil and latitude we need not take a second place. Our fruit output in the near future ought to rival all others. Is it for us to neglect our opportunities?

In view of the importance of some representation of our fruit interest at the World's Columbian Exposition at Chicago, we respectfully ask that ten thousand copies of this, the "Second Biennial Report of the State Board of Horticulture for Oregon," be placed at our disposal for distribution at that Exposition, and ten thousand copies for home distribution, making in all twenty thousand copies, which we estimate should be distributed.

We refer your honorable bodies for further information as to the work of this Board to the reports of the Commissioners for their respective districts, the Commissioner-at-Large, and to the reports of the Secretary, Treasurer, and Inspector of Fruit Pests.

Respectfully submitted,

J. R. CARDWELL,  
President Board Horticulture.

E. W. ALLEN, Secretary.

## PROPOSED LAWS.

**An Act to Define Certain Powers and duties of the State Board of Horticulture; to Amend an Act entitled "An Act to Create a State Board of Horticulture, and to appropriate money Therefor," Approved February 25, 1889.**

*Be it enacted by the Legislative Assembly of the State of Oregon:*

Section 1. The State Board of Horticulture may, as it shall require, select and appoint by a commission, which shall be issued by said Board, any competent person or persons especially qualified by practical experience in horticulture and entomology, who shall be known as "Inspector of Fruit Pests," and who shall hold office at the will of the Board. The duties and compensation for services of an Inspector of Fruit Pests shall be provided for by said Board in conformity to their own powers, and subject to the laws hereinafter enacted. Such Inspector of Fruit Pests shall keep a full and com-



plete record of all his transactions, receipts and disbursements as such officer, and report the same to said Board at its regular semi-annual meetings, and at such other times as it shall require.

Section 2. For the purpose of disseminating knowledge concerning contagious diseases affecting fruit and trees, plants, vegetables and vines, and the remedies, preventives, and disinfectants applicable thereto, it shall be the duty of the State Board of Horticulture, from time to time, as it may deem necessary, to publish in printed form such information, remedies, preventives, and disinfectants as it may approve, which shall be circulated by the Board among the fruit-growers, fruit-dealers, shippers, transportation companies, and agents within the State.

Section 3. It shall be the duty of the State Board of Horticulture, whenever it shall deem it necessary, to make or cause an inspection to be made of any orchard, nursery, trees, plants, shrubs, vegetables, vines, or fruits, or any fruit-packing house, storeroom, salesroom, or any other place or articles within the State; and if found infected with any pests injurious to fruit, plants, vegetables, trees, or vines, or with their eggs or larvæ, they shall notify the owner or owners, or the person or persons in charge or in possession of said places, orchards, nurseries, trees, plants, vegetables, vines, fruit, or articles, as aforesaid, that the same are infected with said pests, or any of them, or their eggs or larvæ; and they shall require such person or persons to eradicate or destroy the said insects or other pests, or their eggs or larvæ, within a certain time, to be specified. Said notices may be served upon the person or persons, or either of them, owning or having charge or having possession of such infected place, or orchard, nursery, trees, plants, vegetables, vines, fruit, or articles as aforesaid, by a member of the State Board of Horticulture, or an Inspector of Fruit Pests, or they may be served in the same manner as a summons in a civil action. Any and all such places, orchards, nurseries, trees, plants, shrubs, vegetables, vines, fruits, or articles thus infected are hereby adjudged and declared to be a public nuisance; and whenever any such nuisance shall exist at any place within the State, or on the property of any non-resident, or on any property the owner or owners of which cannot be found within the State after diligent search, or any property where notice has been served as aforesaid, and where the owner or those in possession shall refuse or neglect to abate the same within the time specified, it shall be the duty of any member or members of the State Board of Horticulture to cause said nuisance to be at once abated by eradicating or destroying said pests or their eggs or larvæ. The expense thereof shall be a county charge, and the County Court of the county wherein such property is found shall

allow and pay the same out of the General Fund of the county, when presented with the proper vouchers and a sworn statement thereof, by such Commissioner or Commissioners; and any and all sums so paid shall be and become a lien on the property and premises from which said nuisance has been abated, in pursuance of this Act, and may be recovered by a suit against such property and premises; which suit to foreclose all such liens shall be brought in the proper court by the District Attorney of such county, in the name of and for the benefit of said county; and in case the property is sold, enough of the proceeds shall be paid into the county treasury to satisfy the liens and costs, and the overplus, if any there be, shall be paid to the owner of the property, if he be known, and if not into the court for his use when ascertained. The State Board of Horticulture or any member thereof is hereby vested with power to cause any and all such nuisances to be at once abated in a summary manner; and the members of said Board, and Inspectors of Fruit Pests commissioned by said Board, shall have full authority to enter into any orchard, nursery, place or places where trees or plants are kept or offered for sale or otherwise, or any house, storeroom, sales-room, depot, or any other such place within the State, to inspect the same or any part thereof.

Section 4. That the State Board of Horticulture or any member thereof be and the same are hereby vested with all necessary power to enforce quarantine against any infected orchard, nursery, trees, plants, shrubs, vegetables, vines, fruits, or any place or articles within the State, when the same are liable to spread contagious diseases injurious to fruit or trees of any kind within the State, and to provide necessary rules and regulations to govern the same.

Section 5. The members of the State Board of Horticulture, and the Inspectors of Fruit Pests commissioned by said Board, shall receive compensation for their services, when actually engaged in the duties of their offices, a sum not to exceed five dollars per day, and their actual traveling expenses shall be allowed when so engaged; and whenever it shall become necessary for any of the Board to abate a nuisance as provided for by this act, compensation for their time and traveling expenses while so employed shall be paid as a part of the county charge provided for in section 3 of this act.

Section 6. That section 13 of an act entitled "An Act to Create a State Board of Horticulture, and to appropriate money therefor," approved February 25, 1889, be and the same is hereby amended to read as follows:—

Sec. 13. There is hereby appropriated for the use of the State Board of Horticulture, out of the moneys in the State treasury not otherwise appropriated, the sum of \$6,000 for the year commencing

January 1, 1893, and \$6,000 for each succeeding year thereafter; and the Secretary of State shall draw his warrant upon the State Treasurer in favor of the Treasurer of said Board for said sums or any part thereof when they have become available, upon proper demand being made for the same.

Section 7. That sections 6, 7, 8 and 10 of said act be and the same are hereby repealed.

Section 8. This act shall take effect from and after its approval by the Governor.

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An Act to Prevent the Sale, Gift, Distribution, Planting, and Transportation of Infected Fruit, or Trees, Plants, Cuttings, Grafts, Buds, Clons, or Other Material, and to Prescribe Penalties Therefor.

*Be it enacted by the Legislative Assembly of the State of Oregon :*

Section 1. All peach, nectarine, apricot, plum, prune, almond, or other trees, budded or grafted upon peach or other stocks or roots, and all peach or other pits, cuttings, buds, or cions, raised or grown in a district where the Peach Yellows or the Peach Rosette are known to exist, and all fruits grown thereon, are hereby prohibited from being offered for sale, gift, distribution, transportation, or planting within the State of Oregon; and any person or persons, dealers, shippers, transportation companies, and agents thereof who shall be in possession of any such property for any purpose, shall, when required by any member of the State Board of Horticulture or an Inspector of Fruit Pests, burn the same without delay.

Section 2. Fruit of any kind, all trees, plants, cuttings, grafts, buds, seeds, pits, cions, or other transportable material of any kind, grown in any foreign country, or in any of the United States or Territories, or in the State of Oregon, infected by any insect or insects, or their germs, or by any fungi, blight, or other diseases known to be injurious to fruit or fruit trees, or to other trees, and liable to spread contagion, is hereby prohibited from being offered for sale, gift, distribution, planting, or transportation until the same shall be thoroughly disinfected in such manner as may be required by the State Board of Horticulture, and to the satisfaction of some member thereof, or of an Inspector of Fruit Pests. And all consignees, agents, or any person who shall receive any fruit or trees, plants, cuttings, grafts, buds, seeds, pits, or scions, imported or brought into the State from any foreign country, or from any of the United States or Territories, are hereby required to notify, within twenty-four hours, the member of the State Board of Horticulture for the district within which the same may be received, or an Inspector of Fruit Pests, of the arrival thereof, and shall hold the same in quarantine at the

first place of debarkation within the State until such Commissioner or Inspector can determine whether they are free from pests which are liable to become contagious, before they can be offered for sale, gift, transportation, or planting.

Section 3. Any person or persons shipping any fruit or fruit trees, cions, cuttings, or plants within the State, shall place upon or securely attach to each box, package, or parcel containing the same, a distinct mark, stamp, or label, showing the name of the producer and shipper of the same, and the locality where grown.

Section 4. Any person or persons, dealers, shippers, transportation companies, and their agents, having in their possession any fruit or trees, plants, cuttings, grafts, buds, seeds, pits, cions or transportable material of any kind infested with any insect or insects, or their germs, or with any fungi, blight, or other diseases injurious to fruit or fruit trees, or to other trees or plants, and who shall sell, offer for sale, gift, distribution, planting, or transportation, or who refuse or neglect to destroy or disinfect the said fruit, or trees, plants, cuttings, grafts, seeds, buds, pits, cions, or other matter, or who shall refuse or neglect to attach a distinct mark or label thereto, showing the name of the producer, shipper, and locality where grown, or who shall use any false or counterfeit mark, stamp, or label thereon, or who shall refuse or neglect to notify a Commissioner or Inspector of Importations, contrary to the provisions of sections 1, 2 and 3 of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than twenty-five nor more than one hundred dollars.

Section 5. This act shall take effect from and after its approval by the Governor.

## AN ACT TO CREATE THE STATE BOARD.

The following is the law creating the Board, as amended by the Sixteenth Legislative Assembly:—

An Act to Create a State Board of Horticulture and Appropriate Money Therefor.

*Be it enacted by the Legislative Assembly of the State of Oregon:*

Section 1. That there is hereby created a State Board of Horticulture, to consist of six members, who shall be appointed by a board consisting of the Governor, the Secretary of State, and State Treasurer. One member of said Board of Horticulture shall repre-

sent the State at large, and one member shall be appointed to represent each of the five districts hereby created, to wit:

First—The First District, which shall comprise the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook.

Second—The Second District, which shall comprise the counties of Marion, Polk, Benton, Linn, and Lane.

Third—The Third District, which shall comprise the counties of Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake.

Fourth—The Fourth District, which shall comprise the counties of Wasco, Morrow, Gilliam, and Crook.

Fifth—The Fifth District, which shall comprise the counties of Umatilla, Union, Baker, Wallowa, Malheur, and Grant.

Section 2. The members shall reside in the districts for which they are appointed. They shall be selected with reference to their study of and practical experience in horticulture and the industries dependent thereon. They shall hold office for a term of four years and until their successors are appointed and qualified; *provided, however*, that three of the Board first appointed—to be determined by lot—shall retire at the expiration of two years. All vacancies in the Board shall be filled by appointment of the Governor, and shall be for the unexpired term.

Section 3. The Board is authorized to employ a Secretary, prescribe his duties, and shall elect from their number a Treasurer, who shall give a bond to the Governor of the State of Oregon in the sum of \$10,000 for the faithful performance of his duties. The Secretary and Treasurer shall hold their appointments at the pleasure of the Board. Before entering upon the discharge of his duties, each member of the Board shall take and subscribe an oath to support the Constitution of the United States and of the State of Oregon, and to faithfully discharge the duties of his office, which said oath shall be filed with the Secretary.

Section 4. The Board may receive, manage, use, and hold donations and bequests of money and property for promoting the objects of its formation. It shall meet on the second Monday of April and October of each year, and as much oftener as it may deem expedient, for consultation and for the adoption of those measures that will best promote the horticultural industries of the State. It may, but without expense to the State, select and appoint competent and qualified persons to lecture in each of the districts named in section 1 of this act, for the purpose of encouraging and improving practical horticulture, and of imparting instruction in the best methods of treating the diseases of fruits and fruit trees, cleansing orchards, and exterminating orchard pests.

Section 5. The office of the Board shall be located at such a place as a majority thereof may determine. It shall be kept open to the public, subject to the rules of the Board, every day, excepting Sunday and legal holidays, and shall be in charge of the Secretary during the absence of the Board.

Section 6. For the purpose of preventing the spread of contagious diseases among fruit and fruit trees, and for the prevention, treatment, cure and extirpation of fruit pests, and the diseases of fruit and fruit trees, and for the disinfection of grafts, scions, or orchard *débris*, empty fruit boxes or packages, or other suspected material or transportable articles dangerous to orchards, fruits, and fruit trees, said Board may suggest regulations for the inspection and disinfection thereof, which regulations shall be circulated in printed form by the Board among the fruit-growers and fruit-dealers of the State; and it shall be the right and duty of every member or officer or appointee of said Board to inspect any fruit or fruit packages, or any trees, plants, cuttings, grafts, or scions, imported or brought into this State, known or believed to be infected by any insect or insects, or the germs thereof, or by eggs, larvæ, or pupæ thereof, or with any contagious disease injurious to fruit or fruit trees; and any person who shall sell, give away, distribute, or transport, or offer to sell, give away, distribute, or transport, any such fruit, fruit packages, trees, plants, cuttings, grafts, or scions, found, upon such inspection, or known to be infested as aforesaid, before the same are disinfected, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished as provided for in section 8 of this act. And any person shipping any fruit trees, scions, cuttings or plants from any orchard, nursery, or other place where they were grown or produced, shall place upon or securely attach to each box, package, or parcel containing such fruit trees, scions, cuttings, or plants a distinct mark or label showing the name of the owner and shipper of the same, and of the locality where produced; and any person who shall ship, transport, or remove, or cause to be shipped, transported, or removed any fruit trees, scions, cuttings, or plants found upon inspection as aforesaid or known to be infected as specified in this Act, before the same is disinfected to the satisfaction of some member or officer or appointee of the Board, shall be deemed guilty of a misdemeanor, and upon conviction shall be fined as provided for in section 8 of this Act; and it shall be a misdemeanor punishable as aforesaid for any person to ship or transport from one locality to another any fruit trees, scions, cuttings, or plants that have been disinfected, without a stamp or label on the box, package, or wrapping thereof showing such disinfection; and any per-

son who shall use any false or counterfeit stamp or label as aforesaid shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined as provided for in section 8 of this Act; and the Board shall have the power to make such temporary appointments as may be necessary to carry out the provisions of this section.

Section 7. The said Board shall elect from their own number or appoint from without their number, to hold office at the pleasure of the Board, a competent person especially qualified by practical experience in horticulture, who shall be known as Inspector of Fruit Pests. It shall be the duty of said Inspector to visit the horticultural districts of the State; to see that all regulations of said Board to prevent the spread of fruit pests and diseases of trees and plants and plants injurious to the horticultural interests of the State, and for the disinfection of fruits, trees, plants, grafts, cions, orchard *débris*, empty fruit boxes and packages, and other material are made known to the people of the State. He shall, whenever required, and under the direction of the Board, and may also upon his own motion and upon complaint of interested parties, inspect orchards, nurseries, and other places suspected or believed to be infected with fruit pests or infected with contagious diseases injurious to trees, plants, or fruits, and he shall report the facts to said Board. The Inspector shall, from time to time, and whenever required by said Board, report to it such information as he may secure from observation, experience, and otherwise, as to the best method of diminishing and eradicating fruit pests and diseases from orchards, and also suggestions in practical horticulture, the adaption of produce to soil, climate, and markets, and such other facts and information as shall be calculated to improve the horticultural interests of the State.

Section 8. Whenever complaint is made to any member of the Board that any person has an orchard, trees, or nursery of trees, or a fruit-packing house, storeroom, salesroom, or any other place in this State infected with any noxious insects or the eggs or larvæ of any such insects injurious or that may become injurious to the fruit interests of the State, such member shall inspect or cause to be inspected the premises or property to which such complaint relates; and if the same is found to be infected as aforesaid, such member shall notify, in writing, the person having charge of such premises or property to appear before him at a certain time and place to be specified in such notice, to be heard in reference to the infection of said premises or property as aforesaid; and if such member, after hearing the person in charge of such property, shall be of the opinion that such premises or property, or any of the same, is infected as aforesaid, he shall notify, in writing, the person in charge

of the same, within a time to be prescribed in such notice, to treat and disinfect said premises or property in the manner prescribed in such notice; and if the person so notified shall neglect or refuse to treat and disinfect said premises or property in the manner and within the time prescribed in said notice, such person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than twenty-five nor more than one hundred dollars; and if it appears upon the trial that any orchard, trees nurseries, buildings, or other structures, premises or property in charge of the defendant referred to in said notice, or any part of such structures, premises, or property is infected as aforesaid, the court shall declare whatsoever of the same is so infected a nuisance, and shall order it to be abated, or may make any other order necessary to prevent its continuance; and it shall be the duty of the Board, or some member thereof, to execute such order; and the costs and disbursements of the prosecution shall be adjudged against the party convicted as aforesaid.

Section 9. It shall be the duty of the Secretary to attend all meetings of the Board and to procure records of the proceedings and correspondence, to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agricultural and horticultural societies, colleges and schools of agriculture and horticulture, and other persons and bodies as he may be directed by the Board, and prepare, as required by the Board, reports for publication. He shall also act as assistant to and obey the directions of the Inspector of Fruit Pests, under the direction of the Board, in the exercise of the duty of his office, and shall be paid for his services as said Secretary and Assistant Inspector a salary of not to exceed one hundred dollars per month.

Section 10. The Inspector of Fruit Pests shall receive as compensation for his services, when actually engaged in the duties of his office, a sum not to exceed five dollars per day, and his actual traveling expenses shall be allowed when so engaged.

Section 11. The Board shall, biennially, in the month of January, report to the Legislative Assembly a statement of its doings, with a copy of the Treasurer's accounts for the two years preceding the session thereof, and abstracts of the reports of the Inspector of Fruit Pests and of the Secretary. The members of the Board shall receive as compensation for their services their actual expenses when attending the meetings of the Board, and shall be allowed five dollars per day for time actually employed.



Section 12. The Treasurer shall receive all moneys belonging to the Board, and pay out the same only for bills approved by it, and shall render annually a detailed account to the Board of all receipts and disbursements.

Section 13. There is hereby appropriated for the use of the State Board of Horticulture, as set forth in this Act, out of the moneys in the State Treasury not otherwise appropriated, the sum of \$3,500 for the year commencing April 1, 1889, \$3,500 for the year commencing April 1, 1890; and the Secretary of State shall draw his warrants upon the State Treasurer in favor of the Treasurer of the Board for said sums, or any part thereof, when they have become available, upon proper demand being made for the same by said Board.

Section 14. The said Board shall report to the Legislative Assembly, commencing January, 1891, what, if any, legislation is needed in aid of the horticultural and fruit-growing interests of the State.

Section 15. Inasmuch as there is great danger to the fruit and horticultural interests of the State from pests and other causes, and no means exist whereby they can be remedied, this Act shall take effect from and after its approval by the Governor.

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## REPORT OF THE PRESIDENT.

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*To the Honorable State Board of Horticulture:—*

GENTLEMEN: Until my duty as Commissioner-at-Large of your honorable body made it my province to look over the whole State in the interest of fruit-growing, I confess to you my conviction that this industry could only be successfully followed in certain restricted districts in Western and Southern Oregon, and a very few favored spots in Eastern Oregon; and the impression that such is the case has been generally accepted and gone abroad without question. I wish now to correct this mistake, and say a few words to dispel this very erroneous impression. The truth is, that there is no district, or soil, or climate in Oregon, from the snow line of its mountain peaks to the sand beach of the Pacific Ocean, that will not, under intelligent management, produce fine fruits. It has been demonstrated, by practical tests and cash returns, that the hitherto valueless wind-swept shifting sand dunes of the Upper Columbia gorges, when protected by windbreaks of poplar or willow trees, and set to

orchard and berries, produce in great abundance the earliest and finest fruits brought to our market, and, bringing the highest prices, are veritable bonanzas to the producers. High up in the mountains, in the deep decomposed basaltic soil, rich in all the necessary mineral element, enriched and blackened by the humus of ages of vegetable decay, in a thermal belt just suited, far removed from the Codlin Moth and other insect pests, is found the home of the apple, the pear, and small fruits. From cozy, protected nooks and sunny slopes in the foothills of Mount Hood come to us carloads of the best early strawberries, which netted the producers the last season eighteen cents per pound for the season's crop. On the bald hills of Wasco County grow as fine European table grapes and other of our fruits as can be grown anywhere. In the hot cañons of Snake River, on the rich alluvial bottom-land, is the home of the raisin, grape, and the peach. On the high rolling uplands of Eastern Oregon, which have heretofore been left out of our calculations, it has been demonstrated that the homemaker may grow his own fruits. For further information regarding these localities, I refer you to the district reports of Commissioners James Hendershott and C. P. Heald.

Western and Southern Oregon established long ago a great fruit-growing reputation, away back in the early pioneer days. These sections have in early times furnished our California neighbors the "big red apples," which justly gave Oregon the sobriquet of "the land of the big red apples." The basaltic wash from the mountains; the deep alluvial deposits forming our undulated valleys; the moisture-laden air from the warm, equatorial ocean current that washes our shores; the equable climate and seasonable rains; immunity from high winds and killing frosts—all conspire to make this *par excellence* a fruit-growing country for all the fruits of the temperate zone. The apple, pear, prune, and cherry we grow in great abundance, of phenomenal size and superior quality; also the peach, the grape, and in some localities the apricot, and everywhere the small fruits. It has also been demonstrated that nutculture may become profitable in these sections, and possibly all over the State. The foothills of our mountains, and the broad, rolling valleys between, aggregate a vast fruit-growing region, not yet fully occupied, now awaiting the advent of the thrifty fruit-grower.

The fruit industry as a business in its variety, extent, and commercial importance, as we find it to-day, is of recent origin and within the memory of the present generation—a worthy tribute to the brain and muscle of men of our time. National and international communication by water, land, and telegraph, railroads, cheap freight rates, rapid transit in fruit and refrigerator cars,

created the supply; inversely, the supply increased the demand—an inexorable law of trade. The future commercial possibilities of the fruit trade are full of promise, and in the light of the increase of the last few years, justify the most sanguine speculations. Shipping green fruit, canning and evaporating, are discoveries of today, and yet in their infancy. These processes will be improved upon, extended and cheapened, and other improved methods of packing, preserving, and transporting will be discovered, as popular taste is cultivated. The new glazed fruit industry is capable of indefinite extension; fruit as a confection to eat out of hand is a new and growing industry. The manufacture of fruit butter, marmalades, jams, and jellies, not to speak of fruit cider, vinegars, brandies, wines, and spirits, are undeveloped business schemes of great promise. Brain and muscle are at work in these lines, and will succeed.

A distinguished and successful fruit-grower of California was requested to furnish a paper on "The Fruit Industry" for publication in the transactions of the California Agricultural Society. The response—brief, comprehensive, in the following well-chosen words—applies so well to Oregon that I am inclined to quote and close this paper: "There is still room in California [Oregon] for thousands of intelligent fruit-growers, such as will plant the right thing in the right place, take proper care of the trees when growing, prune properly, when bearing thin properly, pick at the right stage of ripeness and pack nicely in clean boxes, fight all damaging insects and fungi with the best implements and insecticides to be had, and otherwise use all the intelligence they have in their business. I believe eternal vigilance is the price of good fruit in this or any other country, and for that reason think there will always be a good price for good fruit. Concert of action and union of purpose among fruit-growers is all that is necessary to make fruit shipping profitable, and maintain it so."

Ten thousand square miles of the valleys and foothills of Oregon are in every way adapted to the culture of all the fruits grown in this latitude, of the finest quality and in the greatest luxuriance. Before the advent of the white man and cultivated fruits, this country had demonstrated its capacity to produce the wild fruits abundantly, of fine flavor and great excellence. The Indians, trappers, and pioneers valued these fruits highly and made good use of them. As they were in some sense evidence of a soil and climate adaptation, and prophetic of the great fruit industry now growing up among us, it will not be out of place to briefly make some mention of them; and this seems important in view of the fact that the Pomological Division of the Interior has taken up the subject and

is making collections and urging the improvement of our indigenous fruits by selection, hybridizing, and cultivation, and that some of our best fruits have been thus produced.

The Oregon Crab Apple (*Pyrus rivularis*) is found on cold, marshy ground, bordering ponds, mountain springs and streams, and when favorably situated is a good-sized tree and attains a diameter of one foot, and an altitude of twenty feet. Its rich green, spreading top in the season bears heavily a small, oval, golden-colored apple, which, when ripe, is eaten by the Indians, and was used in early times by white settlers for making preserves, jelly, and vinegar. This species has been hybridized and improved by some of our nurserymen, and no doubt will be further improved, which may lead to a valuable variety in the future.

The Oregon Wild Plum (*Pyrus subscordata*), of which there are two or three varieties, was much valued in early times for its fruit to eat green, for preserves and jam. This plum for quality is about the same as the native red plum of the middle west, and has been improved by selection and cultivation; was used formerly by nurserymen for stock on which to graft the plum and prune. The tree grows to a height of ten or fifteen feet. Another variety produces a round fruit nearly an inch in diameter; another an oblong, resembling in shape, color, and quality the Damson, and, by those who use them, preferred to that variety. Of these something may be expected by hybridizing and cultivation.

We have two or more species of the Wild Cherry — one, *Cerasus demissa*, a shrub or small tree bearing a purplish black fruit, very much resembling the choke-cherry, though of much better quality, and edible; is used to some extent for marmalade; its roots have been used as stock to improve varieties upon. The other, *Cerasus emarginata*, sometimes attains to the dignity of a tree one foot in diameter and thirty to forty feet high, and bears a roundish black cherry about one third of an inch in diameter, bitter and astringent.

The Oregon Elder (*Sambucus glauca*), is a character tree of unsurpassed elegance and rare beauty on the lawn or in the forest; is of vigorous growth, attaining two feet in diameter and thirty feet in height, with a beautifully cut leaf of rich bluish green, decked with showy sprays of creamy white flowers six to ten inches across, and in the fall of the year gorgeously arrayed and heavily laden with purple berries, interspersed with green fruit and blossoms, which continue to bud and blossom from June to September, giving a succession of flowers, green fruit and ripe purple berries the entire season. The berry has a pleasant, sub-acid taste, and with a little sugar is palatable in pies, stewed, or in preserves, and properly prepared makes an excellent wine, for which it is now often used.

Another variety of smaller growth (*Sambucus pubescens*) has a red berry, also edible. This variety is not so widely distributed, and is only found along the coast and up the streams inland.

The Grape (*Vitis Californica*) is found in the southern part of the State, and has been much used in other countries as a phylloxera resistant stock, on which to work European varieties. This fruit is something like the fox grape of the East, and has been some improved by selection and cultivation, and will doubtless be of value in the future.

Oregon is a land rich in native berries, which were held in great esteem by the Indians and early settlers, some of which are really fine and yet much sought after and utilized, and form a considerable commerce in our towns and cities.

The Wild Blackberry (*Rubus ursinis*) is very abundant everywhere, and takes possession of neglected fields, fence rows, and burned districts. The fruit is of good size, oblong, very sweet and juicy, and believed by the children and good housewife to be for all purposes much superior to the cultivated varieties. Tons of this fruit are gathered and sold to families; and if there were more pickers a large commerce could be made with the canneries. The Aughinbaugh is a sport from this species.

Of Raspberries, we have four varieties, the Salmon-berry (*Rubus nutkanis*), a large, yellowish red fruit, with a white bloom, juicy, sweet, highly flavored, very palatable; a red berry (*Rubus incodermis*), highly aromatic, soft, sweet and very good; a Black Cap (*Rubus pendens*), not unlike Gregg's Black Cap, and with us, under cultivation, fully its equal. This berry is widely distributed and abundant. A Black Raspberry (*Rubus spectabilis*), being rather hard and dry to rank first-class, yet with a peculiar flavor; very palatable to some tastes.

The Wild Strawberry (*Fragaria Chilensis*) is widespread, abundant, and very prolific, so that in some regions it is said that hogs fatten on them. The berry is not large, but improves under cultivation, and by some is classed as superior in flavor to cultivated kinds. Several fine varieties have been produced by cross fertilization with this, among which are the Tryomph Degand, True Chili, and several other varieties.

We have several Wild Currants, one a beautiful shrub, and sought in the Eastern States and Europe as an ornamental lawn plant, and valued for its elegant foliage, and early and profuse bloom of pink and scarlet flowers; berry not edible. The Yellow Currant (*Ribes aurum*) responds well to cultivation, and in the wild state is of good size and edible.

Of Gooseberries, two or three kinds are common. *Ribes Menziesi*

is a large hairy berry, edible, but rather insipid, and is not much used. Two others are red and brown when ripe, a fourth of an inch in diameter, sweetest tart; good for culinary purposes; do not know of their cultivation.

Four or more Cranberries are found in the State. *Vaccinium Parvifolium* is a pale-red berry, small, dry, with a very slight cranberry taste, and not used. *Vaccinium Ovalifolium*, high bush Cranberry, is a large blue berry, good, and in some localities where fruit is scarce, very useful; much sought by the Indians. *V. Microphyllum* is a red, high bush Cranberry, smaller, juicy and palatable; only found high up in the mountains. Another is found in the Cascade and Coast Ranges as an evergreen bush, and bears a dark-purple berry; edible. Local botanists speak of other varieties.

The Barberry (*Berberis Aquifolium*), Oregon Grape, so called, is a superb and elegant ornamental evergreen shrub, in leaf somewhat resembling the English holly; in the wild state growing two or three feet high; under cultivation making a showy lawn plant, six to eight feet high, with finely cut, polished leaves and symmetrical head; early in the spring bearing a profusion of showy, yellow flowers, followed in their season by clusters of dark purplish black berries, the size of wild cherries; altogether a thing of beauty rarely equaled; fruit acid and makes a fine beverage, and good pies or preserves. *Berberis Aquifolium* has been adopted by the Oregon State Horticultural Society as the State flower. There is one other of the Barberry family, a smaller variety.

The Salal (*Gultheria Myrsinites*) is scattered through the dense fir forests of the State; is another beautiful, small shrub, evergreen, bearing an acid, edible berry, size and color of the Oregon grape; much sought for by the Indians, and in early days made an excellent wine for the resident Hudson Bay Company employés. The Salal is probably a variety of wintergreen, and seems to thrive best in the deep shades of the forests; has not been cultivated.

The Service Berry, or June Berry, a small tree from six to twelve feet high, we expect to make a good record for in the future. This has been cultivated in other parts of the world and much improved. The Service Berry in the Willamette valley grows in all soils, and at altitudes as high as the snow line, bearing a sweetish, pleasant-tasting berry about the size of our largest wild cherry; as yet it has not been cultivated with us or much utilized.

A Black Haw (*Crataegus Douglassi*), not unlike the Black Haw of the middle West, is sparsely found in some localities.

Our one Filbert, Hazel Nut (*Corylus Rostrata*), is one of the same species as the imported nuts in our market, and closely approximating in size, flavor, and quality, and grows everywhere in our val-

leys, sometimes to the size of a tree ten inches in diameter and from eight to fifteen feet high. No effort is recorded of any attempt to cultivate or improve it.

A kind of Chinquapin Chestnut (*Castanopsis Charysophylla*) is a symmetrical growing tree, fifty to one hundred feet high, bearing abundantly a small, hardshell chestnut, sweet and edible.

In the work of the Board we fully realize that all has not been done that should have been done; yet we believe, considering the small sum of money expended and the difficulties encountered in inaugurating the work, a very creditable and satisfactory advance has been made, and a good work has been done. It was very discouraging in the beginning to meet the captious opposition or indifference of some of our old orchardists, nurserymen, and fruit-dealers, who were alike ignorant of the insect pests and fungi and the destructive work going on in their own orchards and around them; faithless in the work of the Board, and chafing under the suspicion that their rights as American citizens might be encroached upon, it was often a nice and difficult task to bring them into line to see their own interest in the work of this Board. In this line we believe our best work has been done; so that now, with the exception of an occasional superannuated mossback, we meet with hearty coöperation.

New and improved spraying outfits are coming into general use, and apple and pear-growers realize that to have good, sound merchantable apples and pears they must spray with Paris green or London purple; and that when once started it is a simple and inexpensive process, and the best paying investment on the farm. Mr. Wellhouse of Kansas, one of the largest apple-growers in the United States, reports that with the Wellhouse spraying outfit, with a gearing attachment to the wheel of a two-horse wagon, a boy to drive and two men with spraying nozzles, he sprayed six hundred acres with Paris green at an expense of fifteen cents per acre, and expects to reduce this the next season. The great advance in cheapening and simplifying the preparation of effective insecticides—cheapening and simplifying the appliances for using them—and their general adoption, and the increasing interest in this subject, are matters of encouragement. At your request I attended the convention of fruit-growers held under the auspices of the State Board of Horticulture for California at San José November 15th to 19th inclusive. It is needless to say that I was courteously received and enjoyed the proverbial hospitality of the California horticulturist. This to me was a rare opportunity to learn in the school of the great fruit industries of California and to study the working of the State Board and its very efficient co-workers, the county boards.

Of these and their valuable service to the State of California, I shall have much to say hereafter. I wish here to acknowledge my great indebtedness for much valuable information, and return thanks for courtesies shown me as your representative. To Secretary B. M. Lelong, Quarantine Guardian, and Entomologist Alexander Craw, and Assistant Quarantine Guardian Ehrhorn, I am under obligations for valuable information and special favor.

We can scarcely comprehend the magnitude of the fruit industry of California, now unquestionably the greatest fruit-producing country in the world; with more brains and capital invested than any business in the State, and aggregating a return of \$50,000,000 annually. The Santa Clara Valley alone this year shipped of the one product, French Prunes, 1,000 carloads, 20,000,000 pounds; and it is estimated that in four years, when the trees now set come into bearing, this will be increased to 200,000,000 pounds—ten thousand carloads. As the annual consumption of the United States is only 70,000,000 pounds, I leave you and the Santa Clara growers to figure on the problem of distribution and marketing. The apricot, peach, and wine grapes have almost attained alike gigantic proportions, and the orange and raisin grapes perhaps greater. We can have little conception of the interest and enthusiasm in this work. The State Board of Horticulture, County Boards of Horticulture, and State Board of Viticulture are actively engaged in it; and the large sums of money furnished these Boards annually by the State indicate the approval and appreciation of their work. The laws governing these Boards have been carefully studied; and your committee on the revision of our laws has endeavored to embody all their good points in the bill we ask our legislative bodies to enact.

Respectfully submitted,

J. R. CARDWELL,  
President and Commissioner for the State at Large.

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## REPORT OF COMMISSIONER, FIRST DISTRICT.

*To the Honorable State Board of Horticulture—*

GENTLEMEN: Herewith I have the honor to present to you my report of the First Horticultural District, comprising the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook. You are all aware of the fact that it has been hard work to enlist the coöperation of the fruit-growers in the work of



exterminating fruit pests, but I am pleased to be able to state that from actual observation, and from letters received from various parts of my district, that the majority of the fruit-growers have learned that this Board is their friend and not their enemy, as they had at first erroneously supposed. This is manifest from the very numerous inquiries that I am receiving from them as to how best they may rid their orchards of the pests that infest them. I have always taken great pains to furnish all the required information, either by visiting the orchards thus infected personally, or by sending a proper substitute. The results have been that many old orchards have been dug up bodily and burned root and branch, others thoroughly pruned, sprayed, and plowed, thus giving encouragement to those who had already or were about setting out new orchards; they feeling that the pest-breeding places would not act detrimentally to their new orchards; and that many new orchards are being planted out, is evidenced by the frequent calls at my office for information, what and how to plant, and what varieties to be profitable. All of this is the direct work of this Board; and if persevered in, as I think it will, Oregon will soon be what she is by nature fitted for, the fruit-grower's paradise. The demand for Oregon fruit in the Eastern markets is gradually increasing as their superior qualities are becoming known.

#### SPRAYING.

A good deal has been said and written on this very important subject; and it appears to me that by this time intelligent men have become convinced that it is just as necessary to spray fruit and fruit trees as it is to plow a field before sowing wheat; and yet we read in our newspapers articles signed by fruit-growers, stating that they had no success in spraying, and claiming that it did not amount to anything. Now such statements are very misleading; and it seems to me that the materials used were either of a poor and worthless quality, or else they ignorantly made use of the wrong remedies. If the latter, there is no shadow of an excuse, as the bulletins of the Board are very explicit, and anyone who can read and who will follow the instructions therein given, must meet with success, as the testimony of hundreds of those who have used them has proven. I do not wish to repeat myself unnecessarily; but in the face of an article lately published in one of our leading papers, from the pen of a well-known writer and fruit-grower, I beg to give my own experience in spraying, especially with the Codlin Moth, using either London purple or Paris green, in the proportions as recommended in our bulletins. Apple and pear trees sprayed four times showed 90% of sound fruit; three times, 70%; twice, 50%.

and those left unsprayed—for experimental purposes—were riddled with worms, some pears and apples having as many as four worms in each one. It is also a well-known fact that the Codlin Moth cannot be successfully battled in any other way than by spraying with poisons to kill the larvæ as soon as it is hatched and begins to feed. Lanterns, under which tin pans with kerosene have been placed, or tin pails filled with molasses and vinegar and hung in the branches of the trees, will catch most any kind of a moth that flies in the night, except the Codlin Moth.

This subject is so important that I hope you will pardon my dwelling on it so strongly, and permit me to quote from a recent report of the Ohio Agricultural Experiment Station:—

“The introduction of the spraying machine in American horticulture marks an event as important as was marked by the advent of the improved cultivators into our agriculture. Before the latter were introduced, the weeds that infest the soil were fought by the handhoe, but now a single team does the work of many men. In the same way until recently various laborious and partially effective methods were used in fighting noxious insects and destructive fungi; but now many foes of both these classes are fought on a large scale by the forcepump and spray-nozzle; and every season adds others to the list of those against which this method may be successfully used. With a large class of farmers and fruit-growers spraying has become a recognized part of the season’s operation, and therein lies the chief promise of this method. When the belief becomes general that it is as important to save a crop from destruction by its foes as it is to produce it; that fighting noxious insects must take its place as a farm process by the side of that of fighting noxious weeds; that the parasitic plants which absorb the vitality of the leaf are as dangerous to the crop as the plants which dispute with it for the possession of the soil; and when, along with this recognition, there is placed before the farming and fruit-growing community a cheap and wholesome method of preventing the injuries of these organisms, then the vast annual loss now suffered because of insects and fungi will be very greatly lessened.”

This is only one of the many successful trials of the various United States experimental stations, and shows that spraying is a success; but, as before stated, must be persevered in, in order to have good, clean marketable fruit. It is very gratifying to be able to report that the nurserymen in my district (and no doubt they have done the same in other districts) have done a great deal of work in cleaning up their nurseries by spraying and washing against the Woolly Aphis and San José Scale; and I know from per-

sonal inspection that no nurseries on this coast or in the East are freer from insect pests than are those located in this district. The owners of them understand the value of spraying, and under the direction and advice of the Board have been very successful.

In this connection, I beg to submit extracts from reports made to me by Mr. George I. Sargent, who acted as Inspector for me when unable to go myself: "In compliance with your request, I hand you a short report of the work done in your district by me, showing the general condition of the orchards and what success we have met with in creating the determination among the orchardists to eradicate the pests in their districts. You have received at different times reports of the orchards visited and of the pests found therein. So I will only endeavor in this report to show that actual work has been commenced in districts where heretofore nothing has been accomplished, and a partial list of the results obtained with the various washes recommended. At Milwaukie the San José Scale had a firm foothold, and they used the salt, lime and sulphur wash for winter use and the kerosene emulsion for a summer wash in killing the Green Aphis, which literally covered some of the trees." The following letter from Mr. Uren will show what has been accomplished in his vicinity: "Yours of the 31st inst. to hand. The results obtained in this neighborhood thus far from spraying depends very much on the thoroughness with which the job was done. Mr. Peter Walker has good results from the lye and rosin mixture. J. C. Bennett, R. Scott, Seth Lewelling, A. Lewelling, and M. Phale are so far pleased with the lime, salt and sulphur wash, and J. Lambert and W. Lewis also tried it with fair results, but failed to make it strong enough. I do not think of any others, but all these are partially or wholly the result of your visit." At Newburg only one case of the San José Scale was found, and that only on a few young trees. The lime, salt and sulphur wash was used on those trees; and when I happened to be in that vicinity this spring, I was requested by the owner to examine his trees, and could not find a single live Scale. He thinks it the most effective he ever used. For Woolly Aphis he tried the kerosene emulsion. In every vicinity visited I found the same general condition of things with the exception of the San José Scale. In many instances people did not know the pests, and in others they simply did not care. I found that some antagonism to the Board existed, caused by a misunderstanding of the Board's meaning and instruction; and as soon as that was made entirely plain, a desire and willingness to aid the Board in its work was expressed; and I am sure much will be done at once toward eradicating the pests, and the Board can feel satisfied of their hearty coöperation.

The year 1892 will be long remembered by the fruit-growers of Oregon as the first "off year" on all fruits except Petit d'Agen or French Prune, which came to the rescue of all others who were fortunate enough to have a few acres of this choice fruit, and substantiates my former assertion that Oregon is a prune-growing country *par excellence* in growing them so sweet, so abundant, and so large that they are being shipped in sacks and used as top layers in the packing of prunes grown in other States and countries of a much inferior quality. I am still of the opinion that the Italian Prune can nowhere be grown so fine as in Oregon. My advice remains that in planting prune orchards, plant one-third Petit d'Agen and two-thirds Italian.

#### NUT-BEARING TREES.

When speaking of these, the French Walnut, known to the trade as the English Walnut, is uppermost in my mind, as the commercial value of these are far ahead of the Pecan, Hickory, Chestnut, and other eatable nuts. With all of these fruits my experiments have been very successful, even beyond my most sanguine expectations. The Walnuts I gathered from my trees this fall were not only as large as the best imported nuts, but were well filled and exceedingly sweet and nutty. I am very earnest and enthusiastic on this subject, and feel that a new branch and source of revenue has been opened up to the farmer and fruit-grower of Oregon. For more specific information on this subject, I respectfully refer you to a paper on "Nut Culture," read by me at a meeting of the State Horticultural Society held at Grants Pass last spring.

In closing my report, I regret that I am not in position to give you a detailed report of the transactions of the Nicaragua Canal Convention, which meets in the city of New Orleans on the 30th, to which I have been honored as a delegate from the Chamber of Commerce of Portland. The benefits to be derived from this national work by the fruit-growers of Oregon can only be surmised at this time; but when we consider the reduction of freights to both the Eastern States and Europe, and the possibilities of shipping on board steamers in cold storage our green fruits to these markets, we cannot help speculating as to the ultimate results. Those having orchards, or who are now planting, or are contemplating planting will certainly be largely benefited when this great canal shall be completed, the practicability of which is conceded by all who have given the question any thought.

Yours very respectfully,

HENRY E. DOSCH,  
Commissioner District No. 1.

## REPORT OF COMMISSIONER, SECOND DISTRICT.

*To the Honorable State Board of Horticulture—*

GENTLEMEN: My district, comprising Marion, Linn, Lane, Polk, and Benton counties, stands foremost in the extent of available lands adapted to the production of the deciduous fruits. The territory covered in my jurisdiction lies in the very heart of the Willamette Valley, and as a fruit-growing center is developing very rapidly; there having been planted, as nearly as I have been able to ascertain without making an actual census, an area of about 8,000 acres, chiefly prunes, since the winter of 1886 and 1887, when the first start in this direction of any importance may be said to have fairly begun. The acreage in the respective counties is about as follows: Marion, 2,500 acres; Linn, 500 acres; Lane, 1,500 acres; Benton, 2,000 acres; Polk, 1,500 acres.

In the past two years by far the greater percentage of the plantings have consisted of the Italian and Petit Prune, the former leading by about 75%. While there has been quite a percentage of peaches set, say 5% of the entire acreage, plantings in pears, apples, and cherries have fallen off considerably since the report of my predecessor, the late Mr. Wallace. Speaking of apples (page 74, First Biennial Report of your honorable body), Mr. Wallace said: "Our old apple orchards are rapidly going into decay, and will in a few years either be dead or so worthless as to no longer pay for the ground they occupy; and unless more apple orchards are set out, and better care taken of them, my district will not produce enough apples to supply the retail demand." And he urged the people of his district not to neglect other fruits for the prune, "especially the apple, which is naturally adapted to our climate;" but I have to report that this sound advice has not been followed to any great extent. I find comparatively few young apple orchards in my district, and only on those, few in number, in which an unceasing warfare against the Woolly and Green Aphis has been carried on can we rely to produce good fruit. I find the Woolly Aphis in my district has come to stay, and when driven from the orchard takes to the woods and finds lodgment among the wild crab and the apple seedlings that are scattered here and there, watching its opportunity to catch the fruit-grower napping. It has got such a firm hold among us that every fruit-grower must fight it in his own orchard. I find this has been successfully done by a number

of orchardists in my district, whose method of treatment I will note further on. Since my appointment in April last I have made a tour through the different counties in my district, and have carefully noted the development of orchard planting in the various localities, each of which has to contend against the same class of insect pests and fungoid diseases; namely, the Codlin Moth, Green Aphis, Woolly Aphis, Slug, Borer, Apple and Pear Scab, and Powdery Mildew. I have found but one case of San José Scale, and that was confined to two young pear trees in Mr. John Hart's orchard, south of Salem; and when I pointed them out to him he promised to destroy them by digging up the trees and burning them. These trees were bought two years ago from a dealer in nursery stock, and it is thought they came from California. If there are any other orchards in my district infected with the Scale I have been unable to find them. However, Dr. Sharples of Eugene, informs me that there are some trees in his city thus infected; and it is quite likely that there are trees in other large towns in the same condition.

#### FRUIT CROPS.

The fruit crop in my district, excepting cherries and small fruits, was very light this year, owing it is thought to the prolonged rainy weather while the fruit was in bloom and after it had set; however, in exceptional localities with certain varieties there was a fair yield. Mr. Ira Burley in Polk County, for instance, had between 500 and 600 bushels of Petit Prunes in his five-year-old orchard of 600 trees. This orchard is located on a rather steep east slope. Mr. J. P. Shepard, near Zena, Polk County, had a full crop of Petites on his thirteen-year-old trees, while his younger trees were lightly loaded. Apples were so scarce that orchardists generally did not consider them worth spraying, and as a result what few there is are badly worm-eaten. The crop of cherries, however, was up to the average, and better in quality than last year's crop. Also the yield of small fruits was heavy and the quality generally good.

It should not be inferred from the foregoing that the Petit Prune is a surer bearer than the Italian. Mr. Burley had none of the latter in his orchard, and Mr. Shepard had none of the age of the Petites mentioned. His younger Petites showed no better returns than his Italians of the same age, and I have been unable to distinguish any superiority of the Petit over the Italian in this respect where they are grown side by side and treated the same way. I have noted this characteristic carefully this summer wherever I have been, as the idea seems to obtain among a good many that the Petit is a surer bearer than the Italian. In my own orchard the difference has generally been the other way. The

Silver in many localities failed entirely this year. This variety is growing in disfavor in my district on account of its constitutional weakness. I find it doing better in the vicinity of Eugene than in any place I have visited.

#### WOOLLY APHIS.

I find where the lye and rosin washes, recommended in the bulletins issued by the Board, have been used for the Green and Woolly Aphis, their destruction has been certain and prompt; however, apple trees treated with these remedies have been injured some by leaving the bark rough.

Mr. F. J. Beatty of Chemawa showed me some fine young trees thus injured. He used successfully the following for the Aphis: 2 lbs. bar soap, 2 lbs. waste tobacco to 50 gallons of water; boil tobacco to dark coffee color; mix thoroughly. Trees treated with this remedy were left smooth and bright.

This treatment was used on the apple orchard at the Indian Training School in the summer of 1891 for the Woolly Aphis, which had become badly infected with it—so much so that considerable complaint was made by the people in the neighborhood. I inspected this orchard last May and July and found it absolutely free from that insect and also from the Green Aphis, and I am informed by Mr. Beatty, whose orchard adjoins, that it had not made its appearance there up to the month of October last.

An apple orchard in Linn County, near Albany, treated two years ago for the Woolly Aphis, then badly infected, is now perfectly free, none of the insects having appeared since being treated. The lye and rosin wash was used. This orchard formerly belonged to Mr. Gross of Portland, who was for many years proprietor of the Albany depot hotel. It is considered one of the best kept small orchards in Linn County, and it certainly had that appearance when I visited it a few weeks ago.

Mr. H. W. Cottle, who has a fine apple orchard just north of Salem, reports splendid success with the following, taken from the report of the California Board of Horticulture: Summer wash—Caustic soda (98%), 1 pound; rosin, 6 pounds; water, 40 gallons; cook thoroughly at least three hours. I visited this orchard last July (6th) and found it in a thorough state of cultivation—in fact, one of the best kept orchards in my district; but Mr. Cottle, residing in Salem, had not observed the advent of this dreaded insect, which I discovered to exist in great quantities, until I called his attention to it, when he immediately set his man to work, with the result stated.

## BLACK SPOT AND OTHER FUNGOID DISEASES.

The Black Spot, so injurious to apples and pears, has become very common of late years in my district. It has gained such a foothold that some of the best varieties of apples and pears have been so affected with it as to render them worthless. This is particularly the case with the Winter Nellis Pear and the Yellow Newton Pippin. I find, however, that this disease yields readily to treatment where the proper remedies are applied. Mr. Van Eaton, a fruit merchant in Salem, showed me some fine specimens of Winter Nellis Pears that were sound in every way—not a blemish on them. On inquiry I was told that they were grown in Mr. H. W. Cottle's orchard near town. I hunted that gentleman up and asked how he got such fine specimens. It has been a rare thing to find a sound Winter Nellis Pear in this section for several years past. He replied that he had used the Bordeaux Mixture recommended by the State Board of Horticulture, which is as follows: Dissolve 16 pounds of sulphate of copper (blue vitriol) in 22 gallons water; in another vessel slack 30 pounds of lime in six gallons of water; let the latter cool, and pour slowly into the vitriol solution, care being taken to mix thoroughly by constant stirring. The trees were thoroughly sprayed with this just before the buds began to swell. When the leaves were about two thirds grown a second application was made, this time, however, using a solution containing the ingredients in the following proportions: Sulphate copper, 6 pounds; lime, 2 pounds; water, 22 gallons; dissolve the copper in 16 gallons of water and slack the lime in 6 gallons of water; then mix as in the above.

Dr. Sharples of Eugene also showed me some very fine specimens of the Winter Nellis Pear and the Yellow Newton Apple; also other varieties of these fruits that are subject to this disease. In fact, his Yellow Newton Pippin reminded me of my boyhood days when big fine apples were Oregon's boast and pride, and this variety grew to perfection.

But the Doctor had to work to get them. Following is his remedy: Three pounds concentrated lye, 6 pounds sulphur, and 2 gallons water; boil together one half hour; take 10 to 15 pounds whale-oil soap to 100 gallons water; boil and put the other in, and thoroughly mix; apply while trees are dormant, boiling hot. For keeping this mixture hot, the Doctor has had constructed a rectangular tank holding 100 gallons, made of heavy galvanized sheet iron, with an 8-inch pipe of same material, passing through longitudinally about 6 inches from the bottom. This pipe answers for the furnace; and being entirely surrounded by the mixture, it is kept



to the boiling point with very little fire. It is hauled about on a sled or wagon with the sprayer, and is just the thing for applying rosin washes and others that require heat. The Doctor considers it of the utmost importance to have the mixture very hot, as the fumes thus generated are very poisonous to the fungi spores. This remedy is also very destructive to the Aphis family, both Green and Woolly, and thus its advantages are two-fold. I carefully examined his trees and they are as fine and healthy a lot as I have been able to find anywhere.

#### POWDERY MILDEW.

I find a great many peaches on the uplands and clay lands more or less affected with this form of fungi, some varieties suffering more than others. On the sandy river bottom lands it is not so common; however, I have found it there to some extent. In my own orchard I have tried the I. X. L. Compound without success. I began spraying with this compound on the 5th day of July last, soon after the mildew began to make its appearance, following the directions as nearly as possible. I sprayed three times once every three weeks. Possibly had the spraying been begun earlier, the result would have been different. I know of no other person in my district who has tried any remedy for this disease of the peach, but I see no reason why remedies for the Pear Blight will not prove effective for this.

Professor Cootes, Horticulturist of Corvallis Agricultural College, has been very successful in growing gooseberries of both native and foreign varieties without mildew. He uses one half ounce sulphide of potash to one gallon of water.

#### PRUNE TREES DYING.

In every locality visited I found a small per cent of Italian Prune trees dying. This is something unusual, as that variety heretofore has proven the hardiest of any. The leaves lost their bright dark-green color and began to curl during the hot, dry weather in June, and late in July a great many so affected had died entirely. A careful examination of the roots after digging them up revealed no Borer or other apparent cause of the affection, but it is thought by many that the extreme hot dry winds that were prevalent about that time had something to do with it. The loss ranged from 2% to 10%, fatality being greater on heavy clay soils that had not been underdrained. Trees thus affected were confined to orchards four years old and upwards.

Mr. J. R. Shepard, who has a fine orchard near Zena, Polk County, found a few trees similarly affected last year. As soon as

he observed them he cut them back, removing most of the growth they had made that season, his theory being that the evaporation through the heavy foliage during such drying weather was greater than the roots could supply. He showed me the trees thus treated, and they came out all right, and were in a healthy condition this year.

In Henry Stone's orchard, which I visited last July, four miles east of Corvallis, out of 1,700 4-year-old trees about 25% were affected apparently beyond recovery. This orchard is located on rich clay loam soil, but was very poorly drained, the water standing in the furrows during the rainy season.

In Mr. F. J. Beatty's 5-year-old orchard, which is also clay loam soil, but thoroughly underdrained with tile laid 4 feet deep between every other row, the percentage of Italians thus affected was smaller than in any orchard visited. However, about 18% of his Silver Prunes, in the same orchard, same age, were showing similar symptoms; but these trees had all been more or less injured by the freeze of January, 1890, from which they had never thoroughly recovered.

#### WINTER PROTECTION.

I find that comparatively few young orchardists realize the importance of guarding against the winter killing of trees, which is likely to occur most any winter. Should the present winter prove a severe one, and snow should come followed by a cold snap, I predict that there will be thousands of fine young trees, just getting ready to bear, ruined entirely. I have urged orchardists everywhere to be on their guard and provide the remedy, which consists in wrapping the bodies with straw, cornstalks, or old sacks; either is cheap and effective.

Dr. Sharples of Eugene, one of the most intelligent and successful fruit-growers in the State, makes it a practice every year, about the first of December, to set his men to wrapping his trees. He had a large pile of straw in his orchard when I was there a few weeks ago, which he explained to me was for that purpose. He says it costs him from fifteen to twenty dollars to wrap something over 5,000 trees, but he considers it a cheap rate of insurance.

#### METHODS OF PRUNING.

I find that the younger planters as a rule are profiting from the mistakes of some of the older ones, and as a result are making considerable improvement in methods of pruning. The mistake in many of our orchards was in starting the tree with too many branches. When more than four limbs were allowed to form the

head, the multiplication of branches from subsequent prunings was so great that at five years old the top has the appearance of a brush heap. It is conceded by best planters now that four is plenty, and this is better to start with, when properly distributed about the stem.

#### GRAPES.

While it has been demonstrated that fine table grapes of the American and certain varieties of the foreign sorts can be successfully grown in the Willamette Valley, very few fruit-growers have turned their attention in that direction. In Marion County there are two small vineyards of about ten acres each that are paying their owners well—one belonging to A. Mathoit at Butteville, and the other to Jacob Cornelius, a German, near Mount Angel. The Butteville vineyard is located on the southeast side of a steep butte, on a clay soil. The varieties chiefly grown in this vineyard are Royal Muscadene, Chaslas Rose, and Black Hamburg. This vineyard is about ten years old, and was heavily loaded with fine grapes when I was there, the latter part of September last.

The Mount Angel vineyard is located on the south side of the mountain, on which the buildings of the Benedictine Fathers are situated. The soil here is of a basaltic origin, and the ground was very stony; but Mr. Cornelius removed all that were in the way of thorough cultivation and planted his vines in trenches, two feet wide and eighteen to twenty inches deep. His grapes are superior to anything I have seen in the Willamette Valley. He grows the following: Delaware, Concord, and Black Hamburg, and several varieties of foreign grapes, which are very fine, and which he considers far superior to the varieties named above.

At Eugene, Rev. D. E. Loveridge, Rector of the Episcopal Church of that place, has a fine vineyard of about six acres near town, which I am told by the residents, produces choice grapes—in fact, better for table use than those shipped in from California. This gentleman formerly lived in the grape districts of New York, where he had considerable experience in that branch of fruit-growing, and he tells me that he is convinced that Willamette Valley grapes, those grown with proper treatment, are superior in flavor to those in the renowned grape districts of his former State. He says his grapes are freer of that acid characteristic of the Eastern grape of the same varieties—approaching more nearly the subacid. He grows the American varieties only, viz, Concord, Diana, Niagara, Brighton, Moore's Diamond, and Worden.

M. Fitzgerald of Silverton has a small family vineyard where he grows about twenty different varieties of American grapes, and has enough to supply an ordinary family through the season, which

begins with him about September 1st and lasts till late in November. All the above-named growers follow approved methods of pruning; and although differing somewhat in detail, embody the same general principles.

There are many excellent locations in my district for grape culture, and it would seem that considering that most of the grapes consumed in this valley are imported from California and even from the distant vineyards of New York, whom we can excel in quality, our people should turn more attention to the development of this branch of fruit-growing.

#### LARGE ORCHARDS.

The largest bearing orchard in my district is that belonging to Dr. Sharples, eight miles south of Eugene, on the Willamette River bottom. With reference to protection from winds and adaptability of soil for fruit-growing, there is perhaps not a better location for an orchard in the valley. This orchard, consisting of about 8,000 trees, 5,700 bearing, 5 to 7 years old, is situated on a level tract of rich river bottom soil, varying in depth from 8 to 15 feet, and is surrounded by hills on all sides. The varieties are as follows: 4,500 prunes, 3,500 bearing, mostly Italian and Petites; 1,300 Spitzenberg, Swaar, Red Cheek, Lady, Northern Spy, and Baldwin Apples; 1,800 Winter Nellis, Doyenné d'Alençon, Beurre Clairgean pears, 800 bearing, and about 300 Royal Ann Cherries (bearing). This is the largest lot of winter pears I have been able to find—in fact, the winter varieties are generally neglected entirely, and those who are fortunate enough to have them will certainly get good prices. Taking this orchard all around it is the most promising one in the valley.

The Doctor has erected, the past summer, a large drying plant with capacity for drying 800 bushels of prunes daily. He says when he gets it perfected he can dry Italian Prunes in fifteen hours. In its construction he has departed considerably from the old style of evaporators, where the steam from the lower trays passes through the fruit of the upper trays, by which process it is impossible to dry fruit evenly. This dryer cost him about \$3,000, which includes a steam engine and a system of water-works. His tank for dipping fruit is heated with steam, and his rinsing tank, which is divided from the dipping tank by a partition, has constantly a stream of pure water passing through it, fed by a pipe from the water tower; in short, the whole outfit is arranged with reference to convenience and saving of labor. The Doctor estimates that he can gather and evaporate his crop at a cost not to exceed one cent per pound.

At a conservative estimate he will have next year, providing we have a favorable fruit year, not less than 5,000 bushels of prunes. Mr. P. D. Gilbert, a leading grocer and fruit-merchant of Eugene, showed me some samples of Petite Prunes taken from a lot of 1,500 pounds which he bought of the Doctor the past season. Of the entire lot Mr. Gilbert informed me that there were none smaller than sixty to the pound, and that 25 per cent of them run thirty to the pound. These prunes were dried to perfection, and were the finest I ever saw. Mr. Gilbert handles a great many California prunes, and is free to say that he has never seen any that will compare with these, either in size or general excellence.

The Doctor's Italians, Mr. Gilbert informed me, were overdried, but in that condition run thirty or forty to the pound. In a few places in this orchard the trees were not doing well, so an examination of the subsoil was made by digging down with a spade, when it was found that there was a strata of hardpan at a depth of three or four feet. Where these places were found, holes were made with a long iron bar through this stratum into the loose sand and gravel below; into these holes sticks of giant powder, with fuse attached, were dropped, which exploded and made large openings which allowed the water free passage from the upper surface, thus providing thorough under-drainage, and the result has been that the trees are doing much better.

There are also other large bearing orchards near Eugene, particularly the Sladden orchard near town, which I did not get to see on account of the bad weather prevailing when I was there.

One of the finest young prune orchards in the valley is the Humphry orchard, four miles north of Eugene, consisting of 5,000 four-year-old Italian and Petite Prunes and some Silvers. This orchard is well kept, and shows that the owner has determined to make a success of it.

The largest pear orchard in the valley is the one laid out and planted by the late Mr. Wallace, near Salem. This orchard consists of about 200 acres, mostly in Bartlett Pears. The trees are from three to six years old; and I am told by those who have visited it this summer that it is well kept and promises very much to its owners.

Mr. A. Lafollet and Mr. T. B. Jones, ten miles north of Salem, on the Willamette River, have each fine peach orchards three years old. These orchards comprise about 5,000 trees and are very promising.

On the Santiam River, seven miles north of Lebanon, are some very fine prune and peach orchards. The largest one, consisting of about 4,000 peach trees, belongs to H. Bryant, of Albany. Mr. L. A. Tucker also has a fine orchard of prunes and peaches at this place.

The Corvallis and Benton County Prune Company have a very fine prune orchard, consisting of 168 acres of two-year-old Italians. This orchard lies on a level tract of sandy loam soil, about four miles north of Corvallis. The orchard is square, and contains no other variety than Italians. It is being well cared for and presents a very handsome appearance.

Mr. S. A. Clarke has a fine orchard south of Salem, which has been bearing perhaps longer than any prune orchard in the valley. Mr. Clarke was one of the very first, if not the first, to engage in prune growing in this valley, and has done much to interest the public generally in the fruit industry. Mr. Clarke has sold a vast amount of fruit from his orchards.

Mr. H. W. Cottle of Salem has some fine orchards near town, one of them being a 100-acre tract planted by the Oregon Land Company.

Mr. W. E. Burk has a fine two-year-old Italian Prune orchard of 10,000 trees four miles north of Salem.

#### UNDEVELOPED FRUIT LANDS.

Some of the best fruit lands in my district are to be found along the mountain ranges on either side of the valley. My attention was particularly called to this fact two years ago while on a trip through the mountains near Mehama, Marion County, where I found an orchard of about 500 trees planted out and cared for by a Frenchman by the name of X. Stoessel. This place is located on a bit of table land up on the mountain side, about three miles north-east of Mehama. I never saw a finer wood growth or finer fruit or larger than I saw there in the month of September. Apple trees were bright and the fruit perfect. His prune trees grow so rapidly that he feared they would be easily winter killed, so he concluded to check their growth by sowing oats among them. He cut this for hay, and when I was there these trees had a limb growth on them ranging from two to four feet on four-year-old trees, which I considered phenomenal, as prune trees treated in that manner in the valley would scarcely grow at all. Such lands can be bought very cheap, and to those of small means who wish to engage in fruit-growing it would seem to hold out great inducements.

In the discharge of my duties as Commissioner, I am frank to say that I have not been able to give that attention to the horticultural interests of my district that the importance of it demands. I am convinced that the fruit-growing interests of this State are of sufficient importance to invoke of the Legislature that aid which will enable your honorable body to have at your command a man well versed in horticulture in all its branches; one who is thoroughly

posted in plant pathology and insect life; whose sole duty shall be to visit the orchards in every locality where fruit-growing has attained any importance and impart knowledge among the growers that will enable them to successfully combat the various fungi and insect pests. Such a man should be allowed a fixed salary, sufficient to enable him to devote his entire time to the work. Such a man could also discharge the duties of Secretary of the Board, or at least do so with the aid of an assistant at a nominal sum.

While in every locality a shiftless orchardist may be found, it is gratifying to report that a majority who have planted young orchards are wide awake and realize that thorough cultivation and a persistent warfare on orchard foes is the price of good fruit. I find orchardists everywhere eager to learn what to do, and this Board should be in a position to impart to them such information as will enable them to conduct their work successfully. Much harm has been done by the use of nostrums that have been peddled out as "curealls" by the patent-wash men and others. The worst feature of this is that some of these so-called insecticides have been given color of endorsement by horticulturists of standing, who I think have not subjected them to the fullest test. I also find that the use of kerosene in emulsions or otherwise is attended with too much danger to be indiscriminately recommended as an insecticide, however efficient it may be regarded by those who thoroughly understand the mode of applying it.

Very respectfully,

R. D. ALLEN,  
Commissioner District No. 2.

## REPORT OF COMMISSIONER, THIRD DISTRICT.

*To the Honorable State Board of Horticulture—*

GENTLEMEN: Herewith I have the honor to submit the report of the Commissioner of the Third Horticultural District of Oregon, comprising Jackson, Josephine, Douglas, Coos, Curry, Klamath and Lake Counties, and constituting what is known as Southern Oregon.

The horticultural condition of this district was very favorable during the year 1891. All of our bearing orchards were loaded with an abundance of fine fruit of the various kinds grown here, and reasonably fair returns were received for the fruit, and much more progress made in staying the ravages of the fruit pests than during the present year. The mild winter of 1891-2 was followed

by a late, cold spring, in which occurred two very late severe frosts, which, except in a few favored localities, destroyed a fine prospect for a good fruit crop. The tendency of this condition of our orchards was to lessen the amount of spraying so necessary to the destruction of fruit pests as recommended by the Horticultural Board. In some localities most excellent work has been done, with very gratifying results, but in some others the San José Scale has spread, not for want of information of what to do, but from a reluctance to do anything. In every locality we find men willing to do all that we could reasonably ask on their own premises, but when advised that the Commissioner does not feel warranted in proceeding against the dilatory owner of the adjoining property on his own motion, or until complaint is made, the almost invariable answer is, "I will not complain of my neighbor." This may be a commendable trait in human nature, but it is very poor encouragement to a Commissioner who desires to make his work effective and yet does not feel warranted in proceeding until complaint is made as the law seems to contemplate. To effectually stay the further spread of the San José Scale, that is now known to be more or less in all parts of the State, some more radical measures must be adopted very soon. No State Inspector, be he ever so energetic, can do one-twentieth of the work necessary to meet the emergency that is upon us. My judgment is, that every county should have an Inspector of Fruit, and that it should be his imperative duty to examine all suspected orchards, and, when found infected with dangerous pests, if the owner neglects or refuses to apply the requisite remedies, the Inspector should be clothed with the authority to proceed to disinfect the premises as he now has when a complaint has been made and inspection has disclosed the dangerous pests. Wherever the remedy as recommended by the Board in its various bulletins has been intelligently applied the effect has been good; in some instances extraordinarily so.

We have found it necessary to condemn some fruit in the hands of dealers, among which were two boxes of lemons from California covered with the germ of the Oyster-shell Bark Louse, a pest not yet known to exist in Jackson County, and only to a very limited extent in any other of this district. The shippers were promptly advised of the fact, and specimens of lemons mailed to them with the request that no more such fruit be sent here.

The fruit shipped from here this season has been reasonably free from Codlin Moth, and, as far as I have observed, free from San José Scale, or other dangerous pests.

The most valuable work of the Board has been the distribution of knowledge through the various bulletins issued of the better remedies to be used to destroy the fruit pests.



The attention of the Board should now be given to the procuring and general distribution of parasites so far as it is possible to obtain them. In this work California leads the world.

Mr. Albert Kobele's discovery of the *Vedalia Cardinalis* as a parasite upon the Cottony Cushion Scale has saved to the State her vast orange groves, which at one time seemed doomed to destruction, and at a cost to the State of a mere fraction of the millions of dollars' worth of taxable property saved thereby. The fruit-growers of California are sparing no effort to discover the natural enemies of the various fruit pests; and their past success and present intelligent efforts are exceedingly promising of good results. Oregon's fruit interests are proportionately as to her other interests equal to that of California; and it is to be hoped that no backward steps will be taken, but that due consideration will be given to the fruit interests of the State by careful and well-considered legislation, under which the fruit-growers of this State will be enabled to second the efforts of the enterprising fruit-growers of California and share with them in the benefits resulting therefrom.

N. W. Mothoral, on March 28, 1891, reports that in portions of Tulare County, in the vicinity of Hanford, all of the orchards are comparatively clean, the Scale being rapidly destroyed by parasites (*Chilocorus Bivulnerus* and the *Seymnus Marginisollis*), the trees infested with Scale being covered with the larvæ of the *Seymnus*, and he thinks the pernicious scale will soon be a thing of the past in Tulare County.

Alexander Crow (Quarantine Officer) fully confirms this report, as follows: "In a visit to Tulare County recently I found trees that two years ago were seriously affected with San José Scale, comparatively clean, healthy, and vigorous. About San José I observed the same condition in several orchards."

It is to be hoped that Mr. Kobele's efforts to procure parasites from the Sandwich Islands will be crowned with the same success in destroying pernicious Scale that marked the introduction of the Australian Ladybird. If it should prove so, or from any other source parasites that will destroy our fruit pests may be discovered, their early introduction into Oregon should receive the most careful attention of the State Horticultural Board.

For winter use for San José Scale, the Thomas wash of salt, sulphur, and lime is equal to anything yet known, but it is too caustic for summer use upon the tender foliage.

The compound known as I X L seems to be equally effective in summer without burning the foliage.

A careful analysis of the I X L compound by a most competent chemist, obtained through one of our enterprising Southern Oregon

fruit-growers (A. J. Stewart), proves to be a compound of sulphur and lime in equal proportions, and as prepared for market but little water is used in boiling it. To reduce it to the consistency required for use as a spray it must be boiled more or less, or too much is wasted in the sediment. Some of our most extensive orchardists in this part of the State think it desirable to purchase the best of unslacked lime and the sulphur, and to fifteen pounds of each add twenty gallons of water and then boil it for two full hours, or more if the sulphur is not fully dissolved. To prepare it for the sprayer, from forty to sixty gallons of water should now be added, or more if too strong for the foliage.

The large commercial orchards of Southern Oregon, of which so many have been set in the last few years, are rapidly coming into bearing, and the owners confidently expect from them large returns in spite of all the fruit pests with which we are afflicted of late. We can and will stay their ravages.

The pest which we fear most is the careless fruit-grower, through whose neglect our orchards are to be restocked from year to year. Were it not for the indifference to the general welfare of these careless fruit-growers, this end of the State would soon be an almost continuous orchard. Good locations for large commercial orchards are yet abundant in Southern Oregon, and at prices that ought to be an inducement to set them.

Most respectfully submitted, this 28th day of November, A.D. 1892.

J. D. WHITMAN,  
Commissioner District No. 3.

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## REPORT OF COMMISSIONER, FOURTH DISTRICT.

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*To the Honorable State Board of Horticulture—*

GENTLEMEN: I beg to submit to you herewith my report as Commissioner of the Fourth District, which comprises the counties of Wasco, Sherman, Gilliam, Morrow, and Crook.

It was with some diffidence that I assumed the duties of Commissioner in this district last spring, as successor to so worthy a person as Mr. Varney, who had been identified from the first with the work of the Board. He is a man well informed in matters of horticulture and entomology, and it is unfortunate for fruit-growers and the best interests of the State that the Board was deprived of his services at the very time when experience had specially qualified him for the work.

The past year has developed the fact that the principal fruit sections of our district are invaded to a serious extent by many of the more injurious classes of pests that affect deciduous trees.

Until recently we had become accustomed to look upon our beautiful fruit until we not only considered ourselves surrounded by a generous nature, but also comparatively immured from insect pests. We boasted of these facts, and with a feeling of security we failed to inform ourselves of the character and habits of fruit pests, or to guard against them, until they had become very generally distributed among us. But little more than two years ago Inspector Varney related to me his discovery of San José Scale at Milton, Umatilla County. It was then the only Scale he knew of in Eastern Oregon. He expressed much fear that it would be discovered in other localities. Subsequent events have proved this to be true, and it is now quite certain that the pest has been at work in our district for more than nine years. The tree agent referred to by Mr. Varney in his first biennial report had done a good business, and had introduced his trees, with the Scale on them, into many sections of the district. The history of these trees is easily followed. They would die to the ground one year, grow a thrifty shoot the next, which would die down again the following year; repeating this course year after year; while the owner wondered at and never suspected the real cause; and the mischief was permitted to go on and spread. When the presence of the Scale was first discovered it was regarded as something new, and each subsequent discovery only seemed to indicate a rapid spread of the pest; and few realize even now that the San José Scale is not a new thing with us, but that it has taken nine years to develop to its present stage. Its distribution has been so general with us that it is frequently found in the most remote and unlikely places. No locality can claim exemption from it with confidence, and no orchardist can safely assume that it is not lurking among his trees.

Besides the Scale, the Green Aphis, Codlin Moth and Borers have become very common; some of the fungoid diseases have made their appearance, and the Woolly Aphis has been found in some places, but this does not thrive with us, and has not increased in a manner to cause alarm.

The fungoid diseases seem to threaten serious injury. Last spring I found in some orchards near The Dalles what appears to be the genuine Pear Blight. Some trees had been entirely destroyed by it. The owner of one orchard had attempted to head it off by cutting away the affected parts, but without success; what otherwise were remarkably fine and healthy trees, succumbed quickly to the disease.

Later in the season my attention was called to a blight existing on peaches in several localities, which I have been unable to find a name for. The disease has about the same characteristics that the Apple Scab (*Fusicladium dentriticum*) has upon the apple and apple leaf, except that the color on both fruit and leaf is of a white or cream color. On some trees the fruit has been injured to such an extent as to render it unfit for use, and it has secured a strong foothold in some of our best peach orchards.

Within a few weeks several lots of apples were complained of to me as being infected with San José Scale, both in Hood River and The Dalles districts. Upon examination I found it was not the Scale, but the general appearance bore a striking resemblance to it. The center of the affected part appears to have had the skin broken or punctured, and this is surrounded by the red blotch common to the San José Scale. The disease resembles the Shot-hole Apricot fungus (*Septonia cerasina*) of California. I have had no opportunity to judge the extent of this disease, but it exists in distinct localities remote from each other.

The sudden appearance of these pests, or rather the sudden knowledge of their presence in our midst, has aroused some of our orchardists to see the necessity of exterminating them, but very little thorough and systematic work has been done. Many are discouraged at the outset, and regard the task before us a hopeless one, while much of the work done so far has been unsuccessful for various reasons. But few are as yet well-informed; washes have been improperly compounded; wrong washes or remedies have been applied; unsuitable apparatus for spraying has been used, and careless and shiftless work has been done to such an extent that the efficiency of the remedies recommended by the Board are frequently questioned and placed in disrepute. It must be admitted that a few of our washes are not practical in the hands of some, for they require a degree of skill in compounding and using that cannot be expected of all; yet they are so simple, when once the habits and nature of the pests and the use of the washes become better understood, that there is no reason why effective work should not be done by the most of our fruit-growers.

I have endeavored, during the few months of my service, to inform myself of the results of the washes recommended by the Board, particularly with reference to the San José Scale, and have yet to find the first case where the salt, lime, and sulphur wash for winter use, when properly prepared and thoroughly used, has failed to give good results, varying in proportion to the thoroughness of the work. With the lye and lye and rosin washes the results are less pronounced; but the chief difference seems to be in the fact that the

salt, lime, and sulphur wash is more lasting in its effect, and its white appearance on the tree assists one to do more thorough work. Either from its destructive power, or from its obnoxious odor, it checks any new development of the Scale for several months after its application. Last spring I witnessed some orchards where this wash had been used; the young Scale hatched out in portions of the trees that had not been covered by the spray, and I expected to see the trees covered with Scale again in a short time; but a few weeks later I found the same trees quite clean and free from the pest. It is not so with the lye washes; if any of the Scale escape destruction, they are ready to go to work again on any portion of the tree at the earliest opportunity. This fault of the lye washes applies also to the summer washes, so far as I have been able to judge; the good they do is of but brief duration, if not repeatedly used during the summer. All these washes seem useful, however, as a check upon the rapid development of the Scale.

"Poor success" is the almost universal verdict of those who have tried to destroy the Green Aphis. It seems to be a most persistent foe, and I have seen trees in many orchards, my own included, covered with the pest after repeated use of the summer washes. I believe the Ladybird has done more to hold the Aphis in check than any of the washes used. The rosin wash seems to be the most successful wash for Green Aphis.

But few have endeavored to save their apples from the Codlin Moth this year, and the result is manifest. In the vicinity of The Dalles the apples are universally wormy, and in some orchards the whole crop has been rendered totally unfit for any use, and in Hood River Valley the apples seem to be fully one half wormy where no spraying was done. The general verdict now is, that we must spray to save our apples from worms.

In view of the fact that good authorities now urge that spraying with arsenical poisons should be done before and not after the young fruit has commenced to turn downward, I wish to say such a practice would be useless to us, for in some portions of our district almost no if any time intervenes between the appearance of the Moth and the turning down of the apple. The Codlin Moth does not generally appear in my locality till after July 1st; by this time much of the fruit is drooping. In other portions of the district, the Moth appears earlier, but the greatest injury from it is done in the late summer and early fall. I have seen orchards kept comparatively clean up to the middle of August and first of September, to be thoroughly possessed by the Moth's worm by the first of October.

I am not aware that any remedies have been used for the fungi. There is a very limited knowledge concerning it, and the import-

ance of work in that direction must be impressed upon fruit-growers as if it were an entirely new enemy.

One of the most perplexing difficulties I have had to contend with is a popular belief that it is the duty of our Board to exterminate all pests wherever found, at the expense of the State; and the notion exists among some that if they wait long enough the work will be done for them by the State. In fact, the general impression seems to exist that the principal duty of the Board is to perform overt acts upon all infected orchards; and if I mistake not, we are being censured for not doing more in that direction. It may be that the framers of our laws are to some extent responsible for such opinions; but if such was the intention of our law-makers, it was rendered practically inoperative by a limited appropriation. I cannot conceive, however, that it is the duty of the State to attempt such a work in a community already generally infected, or that it would be advisable if feasible. It would soon put a premium on gross negligence and shiftlessness. The industrious and intelligent fruit-grower, who is willing to fight his battle successfully, should be allowed the advantage of his efforts over those of his indifferent and negligent neighbor. For the State to step in and do for the latter what the former has willingly done for himself, would not be justified on any ground. The State should not interfere in these matters where proper individual effort can practically do the same work, unless it be to compel the cleaning up of dangerously infected trees at the owner's expense.

The best efforts of the Board should be directed — first, to ascertaining and bringing before the people the remedies and preventives which are best calculated to do effective work; second, enforcement of stringent laws, which should be enacted by the Legislature, prohibiting the transportation, marketing, sale, or distribution of infected fruit and trees; third, the Board should, under circumstances where any particular section or neighborhood is threatened with a fruit pest, which if not properly checked would become a scourge to that section or neighborhood, have authority to deal with the threatened evil in a summary manner. I am more free to express these views, because, as some of you know, I regard our present laws to a large extent as inefficient.

It was a curious circumstance by which the word "fruit" was omitted from section 6 of our present law, thereby rendering it impossible to prevent the sale of infected fruit grown in this State, while we have power to prevent the sale of infected fruit trees, boxes, etc. This spoils one of the most important sections of our law.

Section 8, another important part, is so cumbersome, and the possibilities of doing good under it are so remote, that there is no

inducement to put it into operation. Under this section a Commissioner cannot compel an orchard to be cleaned until it has been found infected and condemned by a court of law. An unusual amount of formality is required to get into court, and once there, the probability is that the judge and possibly a jury must be instructed in the particular branch of entomology involved before the property is condemned, and the cause must then be subject to the usual delays and appeals of law. Long delays are almost inevitable under this section.

The very cases in which the Commissioners should be required to act are those which require prompt action, and where any delay would probably result in the mischief sought to be averted. In the event of a threatened epidemic from a contagious disease, the proper authorities have power to enforce immediate quarantine against dangerous cases, so the Stock Inspector can condemn diseased stock. No less power should be given the Horticultural Board and its officers. To keep this power from a Board who are supposed to be qualified to judge of the danger, and vest the power of condemnation in Judges and jurors, who are not expected to be qualified, is an unusual and peculiar act.

There should be stringent laws prohibiting the sale of infected fruits. The dealers are usually willing to work under such a law, for they and their customers do not want bad fruit. I have received much encouragement in this direction this year, many being apparently as anxious to keep clean fruit for sale as I was to have them, and the result has been in favorable contrast to the condition of the market last year. Aside from the danger in scattering fruit pests attending the sale of infected fruit, there would be a sufficient reason for preventing the sale of such fruit if it would result in compelling fruit-growers to clean their orchards. Some cannot be made to see the necessity of it in any other way.

This report has necessarily dwelt on matters that might lead one to suspect that the fruit interests of our district are doomed; I wish therefore to emphasize the fact to be the contrary. We have received more encouragement this year than ever before. While the fruit crop of the State has been regarded as almost a failure, and the failure has to some extent been felt with us, yet the output and quality of our fruit has surpassed all former years; particularly has this been true from The Dalles eastward. For the second year in succession, Wasco County has carried away the first prize at the Portland Industrial Exposition for the best county exhibit of fruit. While some of the best counties in the State did not compete, it is the fact that a failure of crops prevented them from doing so, while

Wasco was able to make the best display it ever made; that makes it a matter of special satisfaction to Wasco fruit-growers.

I hesitate to refer to the natural and developed resources of the Fourth District, for it has become so customary for us to laud the section of our choice with such high songs of praise, that we are not expected to stop short of all that can be said in its favor. I do not wish to do my district nor myself an injustice by attempting such a task at this time.

The time has come when Western and Southern Oregon should accord to Eastern Oregon equal, if not superior, advantages for the production of the hardy fruits.

Heretofore that part of the State lying west of the Cascade Mountains has been regarded as most favorably situated for such purposes, with the supposition that the climate and soil were more suitable. As a result, the fruit interests of that part of the State have been more fully developed. But the experience of the last few years shows that Eastern Oregon has certain advantages that cannot be overcome. Particularly is this to be noted during the spring months. When the growth of fruit is being retarded in Western Oregon by late rains and for want of sunshine, the warm sun of Eastern Oregon is preparing its fruits for a much earlier market, and consequently better prices. Our nights are also less cool during the summer season, thereby enabling us to produce the finest quality of table and wine grapes, which even California cannot excel, and which, with the exception of a few hardy varieties, are not thought of as a market product in Western Oregon.

With these advantages for growing fruits, we are still more favored by being exceptionally located with reference to the markets. Within easy access of Portland, we are enabled to supply that market for ten days or two weeks ahead of the fruit-grower in the Willamette Valley—or, for that matter, any other part of Oregon—thereby securing the *cream* of prices. When the market there is fully supplied, and prices go down, we ship it to Montano, Idaho, Utah, etc., where we will still be ahead of local fruit, insuring remunerative prices. To show the success of of these methods, some of our leading strawberry-growers netted but a fraction less than twenty cents per pound-box for their entire crop of strawberries the past season.

Thus is springing up an extensive and important industry in growing and marketing the early peach, plum, cherry, strawberry, and other small fruits within our district.

But no less important is the very extensive development of our prune, apple, and pear orchards and vineyards. The flavor and quality of our orchard fruits are unexcelled, and their merits are



becoming fully recognized, as may be illustrated by the fact that at the present time \$1.50 to \$2 per box is being offered for carload lots of our apples, *to ship to the California markets*, while California apples—good looking at that—are being offered for sale at less figures in the Portland market.

It has been said that Oregon possesses a greater variety of climate and soil than any other State in the Union. I believe it can be justly claimed that one county of our district—Wasco—possesses all that is known to Oregon in soil and climate. On its western borders exists the protracted rainy seasons peculiar to the Willamette Valley; its eastern borders extend well over into the Inland Empire, where there is one third the annual rainfall of its western boundary. Intervening, there are several well-defined and peculiarly situated sections, or valleys, each with its characteristic climatic conditions. Its soils range from the deep, rich deposits of the bottom-lands along the Columbia River and its tributaries and the clay lands of the foothills, to the basaltic formations bordering on the snowlines of our mountains. Within its bounds is found the grandest scenery to be found in any country or any clime. Its mountain peaks delight in eternal snow and ice; the lofty summit of Mount Hood, clothed in pure whiteness, stands as a guardian sentinel with imperial grandeur over the luxuriant valleys, with their orchards, vineyards, and berry farms, that lie nestling at its feet, refreshed by the sparkling waters that flow from the eternal snows and ice that crown its heights; while close by the grandest of all rivers, the mighty Columbia, speeds on its way to the sea.

Respectfully submitted,

C. P. HEALD,  
Commissioner District No. 4.

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## REPORT OF COMMISSIONER, FIFTH DISTRICT.

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*To the Honorable State Board of Horticulture—*

GENTLEMEN: I herewith submit my second biennial report of District No. 5, which I have the honor to represent.

It gives me pleasure to inform you that since my last report, two years ago, a very much greater interest is being manifested throughout my entire district in horticulture. New orchards have been planted and old ones renovated—in fact, the day is not far distant when the fruit interest will be paramount to all others.

Until quite recently, the ubiquitous fruit-tree peddler, with his

inferior stock and exorbitant prices, has perpetrated gross frauds upon the community. Feeling an interest, and believing it a duty, I have taken considerable pains in advising those who contemplated purchasing trees in regard to prices. Where 30 cents was paid one year ago, the best of yearling prunes can now be had at any point on the railroad for 10 cents. The reduction has had a tendency to induce a great many to plant extensive prune orchards.

As I remarked in my last report, there is no section of country on the Pacific Coast better adapted for fruit-culture than Eastern Oregon; apples, prunes, pears, plums, apricots, and all kinds of berries grow to perfection. With but few exceptions, those engaged in fruit-culture are novices. What they want is to be encouraged and educated in that line. They want it impressed upon their minds that if they expect to succeed in their undertaking, they must take the best possible care of their orchards from the time they are planted for all time to come; cultivate well, prune well—never plant nor sow anything in an orchard. Follow these rules, and the great Creator of the Universe will, in His beneficence, accomplish the rest.

In nearly every locality where fruit-growing has become prominent, local organizations have been formed which have been very beneficial to the fruit interests. Such organizations have a tendency to stimulate those so engaged to take a greater pride in the care of their orchards, the gathering and marketing of their fruit, and should be encouraged by all so engaged.

A great mistake many make is setting their trees too close. For prunes, plums, and cherries, 18 feet is full close; for apples, 25 feet is sufficiently close, 30 feet would be better.

Another serious mistake is the planting of too many varieties, especially apples. Select a few trees for family use; for your commercial orchard, not to exceed three or four varieties; and as most persons buy by the eye, select large red ones, that mature well, and those that are the most inviting in appearance. Protect the southwest side of your trees by boards, burlap or any other material to prevent the hot rays of the sun from producing sunscald—a diseased bark—and frequently the loss of the tree. During the last year a considerable amount of spraving has been done in my district, the result of which is the saving of from 80% to 90% of the fruit, and I am of the opinion that in another year, by vigilance, the Codlin Moth will be a thing of the past.

#### EASTERN OREGON SCENERY, CLIMATE, ETC.

There are few places that the scenery is so diversified as in Eastern Oregon—the broad prairies with their luxuriant meadows, the snow-capped mountains that stand up in silent and awful testimony

to the greatness and power of the Great Creator. Whether rising in solitary magnificence from the bosom of wide, extended plain, or piled up as a separate wall through the length of a whole continent; whether belching angry flames from their summit; whether soaring aloft snowclad to untrodden heights, where eternal winter dwells in every aspect and in every form—mountains are the fit representative of everything—the greatest and mightiest in the material world. Perhaps there is no place in all Eastern Oregon that the scenery is so sublime as that of the Cove, in Union County. Notwithstanding the sublime conception one may entertain in regard to the marvelous handiwork of the Diety, he who views the magnificent scenery of the Cove is lost in utter astonishment.

The foothills are densely covered with fir, pine, tamarack, alder, birch, and other varieties of timber; coursing down the slope into the valley are scores of spring branches, some hot, some cold. It is a sight beyond description to see them leaping, plunging, bubbling down the hillside, all seeming to vie with each other for speed; and singing, as with one voice, hallelujah to their Creator, passing on until lost in eternity of waters. I envy not the person that can witness such a grand spectacle and not feel grateful to the giver of such magnificent gifts. The same might be said of many other places in Eastern Oregon.

This country is but in its infancy. No one, unless he has witnessed the marvelous changes that have taken place in the last few years, can give an accurate conception of the possibilities in store for it in the future.

JAMES HENDERSHOTT,

Commissioner District No. 5.

Cove, Union County, Oregon, November 26, 1892.

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## REPORT OF INSPECTOR OF FRUIT PESTS.

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*To the Honorable State Board of Horticulture—*

GENTLEMEN: I have the honor to herewith submit the report of my labors and observations for the balance of my term of office as Inspector of Fruit Pests. My term of office as Commissioner of the Fourth District expired on the first day of April, 1891; but as no appointment was made by the proper authorities, at the request of your body, and in accordance with the provisions of the law creating the Board, I continued to occupy the position until the twenty-fourth day of August following, at which time I tendered my resig-

nation as Commissioner, having arranged to engage in business in Southern Oregon which would require my constant attention as early as the middle of the month of October. No notice was taken of my resignation by the appointing Board, to my knowledge. Under your direction, however, I continued to devote all the time I could to the work until your semi-annual meeting on the twelfth day of October, at which time I drew my salary—a very agreeable duty by the way; and with a heart full of good wishes for each and every member of the Board, and for the success of the important work so well begun under your supervision, I left the work to be resumed by other and I trust more competent hands.

In a general way, I am more than ever convinced that the climate and soil of Oregon are peculiarly adapted to the growth of fruit. All will acknowledge that the apple, the pear, the prune, and the peach, as well as the varied small fruits, are perfectly at home somewhere—may we not say everywhere—within the borders of our great and growing State. In no other State of the Union, save that of our neighbor Washington, can these fruits be grown at so little expense, or suitable orchard lands be obtained so cheaply. We have been told that in years gone by all the orchardist had need to do was to plant the tree, ever so carelessly, and in a very few years its branches were found bending to the ground with its burden of perfect and luscious fruit.

The history of the rise and fall of the Oregon old orchard, its productiveness and profits, were plainly set forth by President Cardwell in a former report. A change has come, and it is now apparent that a large proportion of these once profitable and productive orchards are no longer worthy the proud name they bore. The natural elements remain—the climate and soil are still largely unchanged—but the constant croppings, want of care and cultivation, and the inroads of insect pests have wrought their legitimate work. Happily, too, a change has come in this, that all over the State farmers and fruit-growers are beginning to cultivate and plant with an eye to business.

New and carefully handled orchards are springing up on every hand, and their owners are alert to learn what, how, and where to plant, and how best to protect and care for their trees. Within the last decade many new orchards have yielded a larger annual profit than any other product of the farm. Our home supply of fruit and nursery stock proving inadequate to our increasing demands, we naturally turned to California and other markets to supply this deficiency, and from thence came certain diseases and insect pests, notably the Woolly Aphis, Codlin Moth, and San José Scale. Thus this important industry was met in its incipiency by these newly

discovered foes. Leading horticulturists of the State, foreseeing the danger before us, and following in the footsteps of the fruit-growers of California and other States, asked and obtained from the Legislative Assembly of Oregon the passage of an Act creating the present State Board of Horticulture. The wisdom of that Act is unquestioned among the fruit-growers and intelligent citizens of the State, despite the fact that an effort to abolish the Board was made at the last session of the Legislature.

It is to be hoped that our horticultural interests will not be jeopardized in the coming Legislature by legislators who, like some in the past, "know nothing personally of the work of the Board," but said they "were acting for their constituents"—constituents doubtless as ignorant of that work as themselves. We cannot now afford to turn backward by removing our fostering care and support to the fruit interests of this State.

Thousands of trees were damaged in the past winter (1890-91) by what is generally known as sunscald, or sap blight, and bursting of the bark, in Eastern Oregon, and in Western Oregon as far south as Eugene. South of that point but little injury was done. The winter had been very mild until the last days of February, at which time fruit trees were budding out; and in many places on the Columbia River east of the Cascades peaches and apricots were showing bloom in many locations.

In the Willamette Valley, cold storms of rain and sleet and a cold late spring had a similar effect upon the tree and fruit. The trees were left with bare and naked limbs, with a scanty showing of leaves at the tips, and with here and there a bearing fruit spur. In many instances the bark was bursted on the trunks and in the branches of low-grown trees.

I am unable to explain the various functions which roots, stems, leaves, and flowers have to perform, and the changes that take place during the growth of these organs, that make the tree. It may be taken for granted that to cause the upward flow of the sap, moisture, heat, and light are necessary; and that when these come in contact with that portion of the tree above the soil in sufficient quantities or force, the sap will flow and the tree will start into growth regardless of the conditions of the soil beneath it. In the winter of 1855-56, which proved so fatal to the orchards all through the Northern States, the trees were killed to the snowline, while their roots were enclosed in frozen earth. The same has been witnessed in Oregon within a few years last past where snow laid upon the ground. Our climate is such as to render this subject one of vital importance to the orchardist; and to devise the best and most practical means of protection to the tree from the sudden trans-

ition from the growing state to frosty and freezing weather, should be his study. When the orchard continues to grow late in the fall, or the warm weather of midwinter causes the sap to flow into the branches, succeeded by a low temperature, the trees are liable to injury. I have often noticed in handling nursery stock, that when dry in the fall, and heeled in the ordinary manner, the trees were uninjured, while those left in the ground undisturbed suffered more or less. Possibly the cutting of the roots of the former in digging may have had something to do with this result; but I am inclined to think that it may be attributed to the fact that it is a custom among nurserymen to heel them in thickly, leaning at an angle of about forty-five degrees to the south, thus shading them from the direct rays of the noonday sun. An orchard located on a northern slope, or on a high hill, is less liable to injury from this cause than if grown in low or sheltered lands, or on a southern exposure. I wish here to call the attention of orchardists to a practice which is altogether too prevalent among our nurserymen, viz, that of stripping the leaves from their trees and digging before they are sufficiently ripened and matured in the fall of the year. A tree may have made its growth, but requires the cool weather preceding the winter months to harden up or ripen the wood in order to withstand the colder season of winter and be in a healthy condition in spring. If dug while yet green, there is water, and not starch in the cells. The writer received, the past season, a small consignment of one-year-old trees as well grown as one could wish, which by midwinter were every one dead, doubtless from the above cause. Trees should never be deprived of their foliage until after sharp frosts have entirely stopped their growth; better still to allow them to remain in the ground until nature has defoliated them.

Trees injured by sunscald will show dark brown spots or patches of dead bark, and are sure to become infected with borers. We know of no better preventive than shading the trunk by using boards or shakes set on the southwest side, wrapping with straw or thick paper, or coating with whitewash made of lime, soap and sulphur.

As a remedy for trees injured, tie the bark in place, if broken, as soon as discovered; cover the wounds with grafting-wax, or what is better and always readily obtained, apply a composition of green cow manure and clay, to exclude the sun and rain, and wrap tightly with any cloth at hand. This done, and in case the tree is severely injured, cut back the top at once so as to form practically a new top. It is not safe to attempt to save the top if generally infected, as it would only put forth water sprouts from the trunk and limbs, forming an unsightly head at best.

The experience of another year leads to the conclusion that nearly all our old apple orchards are but a public nuisance, and that the sooner they are destroyed, root and branch, the better for the country at large. But a small proportion of their owners make any effort to cleanse them of Woolly Aphis and Codlin Moth; and so long as they are thus left alone they are not only unprofitable incumbrances but a constant menace to the newly-planted orchards. Wherever the San José Scale has been found, energetic measures have been adopted to exterminate it, and the remedies recommended in our bulletins have been used with varied results; when thoroughly tested and persistently applied, with fair success, but often otherwise, through the carelessness and lack of good judgment on the part of the sprayer.

About the cities of Portland and The Dalles, where the Scale had gained so strong a foothold, good work has been done, many infected trees being cleansed, others cut down and destroyed. At The Dalles, most efficient work was done during the great fire of September 2, 1891, which swept away so much valuable property, so many beautiful homes and gardens, the entire district being overrun with Scale.

Thorough work is still a necessity in these localities, and united effort on the part of every fruit-grower and gardener is needed to exterminate or even control this rightly named *Pernicious Scale*. The winter washes will accomplish much, but I would not trust to this alone, but would urge the use of the summer remedies also as soon as the young Scales are hatched out, at which time they are very easily killed.

I cannot forbear mentioning that our fruit-growers are too often led to listen to the ignorant and misleading statements of would-be horticulturists ever and anon coming to the front through the public press, examples of which are the following: One who pretends to know whereof he speaks, in a recent issue of the *Oregonian* doubts the efficiency of spraying with arsenites for the destruction of the Codlin Moth. Who does not know that the leading horticulturists all over the land, from Prof. C. V. Riley down through all the State Experiment Stations from Maine to California, have settled this question affirmatively years ago? The same author appears again in the same paper on the 14th day of July last, announcing, "No Codlin Moth this year." On the same day, at the meeting of the State Horticultural Society, convened at Newberg, samples of apples were on exhibition fully one half infected with the Moth, many of the larvæ having already escaped. But it may be asked, What of all this? Wherein the harm done? I answer, this year, as happened the year before when the same announcement was

made by the same authority, some party might again be led to neglect spraying until their crop was ruined.

Another fruit-grower recommends the use of lights by night to trap the Codlin Moth, and a milkpan one fourth full of Moths was caught in a single night. This experiment, too, has proved unavailing. Probably not more than one in a hundred so entrapped were Codlin Moths, while many of them were friends, and not enemies.

Now, by repeated examinations, we have found that less than 50%, generally not more than 25%, of the larvæ of the Apple Moth falls to the ground with the infected fruit. A large proportion leave the fruit before it falls, and, spinning their silken cord, thus descend until they reach a leaf or limb, and then seek a hiding-place in the treetop.

It is well to bear in mind that the Codlin Moth is a winged insect—a lively one, at that—who will not wait to crawl up a tree, or stop to dip his pretty wings in a dish of oil, except by mere accident. The statement further asserts that as many as 125 worms were found under one band after being on a tree one week; showing, if our estimates are correct (see California Report Board of Hort., p. 82, 1888; also Michigan Report Board of Hort., p. 114, 1889,) that more than 500 apples were infected at that time on the tree. This amount of fruit, if sound, at the average market price would pay all the expenses of spraying the tree for a number of years, by which 50% to 90% of the crop may be saved. There is little consolation or profit in killing the worms after they have despoiled our crops of fruit. It is better to kill the worms in the first instance, knowing as we do that it can be done.

Another writer, in a late copy of the *Northwest Horticulturist*, suggests the use of crude petroleum, asafetida, and turpentine in the band system. Now, it occurs to us that the larvæ of the Moth would, doubtless, turn away in disgust at the very smell of the above compound and seek other and more congenial quarters, thus defeating the object in view. The bands upon the trunks and cloths placed in the crotches of the trees should be examined as often as once a week; and if every bearing tree in the country was thus cared for, we might reasonably expect better returns from them.

By reference to my former report, I find that my visit to Douglas County was omitted. Leaving the train at the thrifty young city of Roseburg, in company with Hon. D. S. K. Buick and Judge G. W. Riddle, we visited several gardens and orchards in this beautiful Umpqua Valley. In the older orchards the usual lack of culture is manifest on every hand. The Woolly Aphis has undisputed possession of them; but here, as elsewhere, the newly-planted orchards



are being cared for in a manner that indicates that their owners understand that good cultivation only will bring profitable returns. Here I found no San José Scale, but learned later in the year that it had a foothold in one or two locations near by. This valley has long been regarded as one of the most pleasant and picturesque spots in the State. Its rich bottom-lands along the river and its tributaries, composed of a warm, sandy alluvial soil, and the strong, fertile red clay lands of the rolling hills, combine to make this a most desirable location for general farming as well as for growing fruit. Among the prominent fruit-growers of this vicinity are Messrs. F. Johnson, O. F. Godfrey, and P. Cooper. A few miles south of town is the fine plant of B. C. Agee, consisting of 150 acres of young orchard, including some thirty acres planted to peaches and apricots; also the well-kept orchard of W. C. Winston, who has 45 acres in fruit, from two to six years old, 20 acres of which are prunes in bearing and 10 acres in Bartlett Pears; also that of Wm. McBee and others, which I did not find time to visit.

Accompanied by Judge Riddle, we proceeded to the town of Riddle, on the South Umpqua. The Judge has about 120 acres of orchard, principally prunes, two to four years old, largely Petites, some 200 pear trees, about ten acres in peaches, also apples and other fruits, all of which, save the remnant of the old apple orchard, were clean and thrifty.

Mr. J. D. Riddle has 4,000 prunes, two years old, mostly Petites. This orchard shows good culture—the bark bright and smooth; just what might be expected in such a soil and with such care.

In the orchard of John Hall, Esq., of Myrtle Creek, were the largest growth of prunes I have ever seen. This orchard contains some twenty-two acres of prunes, three and four years old, three-fourths Petites, the balance Italian and Silver Prunes, and about two acres of peaches.

Here, as elsewhere in this State, the Silver Prune is not hardy, the trees having suffered with sunscald. Mr. Hall has an old apple orchard which is infected with Woolly Aphis.

From this young prune orchard, 8,000 pounds of prunes were cured the present year, which sold at 8½ cents per pound. Through the courtesy of Mr. Hall, a day's ride was occupied in the orchards along the river.

At H. A. Adams' place are fourteen acres of prunes, three fifths Petites, the remainder Italian, Silver, and Bulgarian Prunes, five to seven years old; also an old apple orchard. His trees are planted too thickly, and, though looking very thrifty, would be improved by cutting out at least one half of them. Last year his product of dried prunes from this orchard was 20,000 pounds, which sold at 8½ cents to 10 cents per pound.

Mr. J. W. Weaver has 25 acres of prunes, three fourths Petites, the balance Silver and Italian, four to eight years old. This year he cured 15,000 pounds, which sold for  $8\frac{1}{2}$  cents to 10 cents per pound. Last year, as I was informed, three acres of this orchard yielded 28,000 pounds of cured product, which brought  $7\frac{1}{2}$  cents to 9 cents per pound. Taking the less price named, this would amount to the snug little sum of \$700 per acre. Here we found some six acres of very good apple orchard. Mr. W. has two driers, and samples of his fruit shown us were of superior quality.

Mr. Simon Selig has thirty acres of orchard, largely prunes, some 200 old trees, the others one to eight years old.

Formerly the Umpqua Valley was noted as an extensive stock and wool-producing country, but upon the advent of the railroad connecting it with Portland, farmers turned their attention to the raising of grain, and lately to fruit-growing. What is now needed to develop this exceptionally fine fruit belt is population. When these large tracts of land now held by individuals shall be subdivided into smaller plants, thus inviting immigration, then these evergreen hills and valleys will become the homeland of thousands of busy and prosperous families.

Early in June I visited the orchard of Captain J. A. Gross at Albany. Last year I regarded this as one of the most promising young orchards of its size in the State; but all its careful culture and training had not saved it from the injurious effects of the past winter. Apples, pears, prunes, and cherries suffered alike, and many of the trees were showing no fruit, and were nearly leafless. I pruned a few trees, as above advised, and learned later that this treatment had saved them, though this should have been done at least a month earlier in the season.

On the following day I visited Eugene, and found the prospect for a good crop of fruit much better than in the valley below or in Eastern Oregon, prune and plum trees showing even more fruit than they should carry. A visit to the thrifty orchard of Captain Sladden revealed the fact that the injury to trees in this vicinity was very slight.

On June 4, I found Dr. A. Sharples' men spraying for Codlin Moth, this insect having commenced its depredations in earnest in this section. The Doctor is using a spray composed of whale oil, soap, and blue stone (blue vitrol) for the Black Spot, (*Fusicladium dentriticum*), which had attacked the leaves of his apple and pear trees, and is confident this wash will be successful.

I would here note that in the use of soap and concentrated lye for the Green Aphis the present year, I added sulphur—1 pound to 20 gallons—to check the same disease which had appeared on the leaves of the young trees, which proved successful.

The Doctor has a very convenient apparatus for preparing the liquor and applying it, and believes in using it. His orchard had been badly infected with Green Aphis, as was plainly to be seen, but he had succeeded in destroying them. The injury to trees here was very slight, although he had taken the precaution to wrap with burlap the larger portion of his eighty acres. As the reward of careful and intelligent handling, this orchard was well loaded with fruit.

In the vicinity of Salem are several promising young orchards, the most of them in hands that will spare no pains to keep them in good tilth and free from insect pests. Here some loss was incurred last year by the nurserymen on account of the Woolly Aphis in apple stock, and it is very gratifying to know that they see the importance of raising clean stock; in fact, there is evident improvement in this direction among all the nurserymen throughout the State, I believe.

H. W. Cottle, Esq., has eighty acres of orchard planted last year. This is of mixed fruits, and in fine condition, except that the Green Aphis and Curled Leaf had made their appearance in apple and peach trees. I noticed some apple trees that had every appearance of having had Woolly Aphis in them the previous year, which showed no signs of them now. These trees had all been sprayed during the winter with strong lye. Mr Cottle took me to another orchard of some 35 acres of older trees, which he feared might have San José Scale in it, but none was found.

Mr. Cottle is an earnest and progressive fruit-grower, and a hearty supporter of the work of the Board of Horticulture.

June 19, I met C. P. Heald, Esq., at Hood River, who courteously invited me to a seat in his carriage for a two days' trip through this justly celebrated valley (?) of "big red apples" and luscious strawberries. Proceeding up the East Side, we visited several very thrifty young orchards, quite well laden with fruit, and halted to dine with my old friend D. K. Ordway, whose family were old-time friends and townspeople in the old Pine Tree State. Here is an old orchard that has been nearly ruined by the Scale, and probably has been infected with it for several years, though not discovered until within the last year. Mr. Ordway had sprayed pretty thoroughly in winter, but has yet more to do, if he would save his trees.

Among the thrifty young orchards visited may be named those of M. V. Rand, Peter Mohr, and Mr. Turner; also the orchards of Mr. Calkin and B. Warren. With the latter I had had some correspondence, having previously been notified that the Scale was on his trees; but we failed to find it at either place. These men

were spraying, with the hope of saving their fruit from the ravages of the Codlin Moth.

We were more unfortunate, however, as we came to the old orchard of Mrs. Hutton, from whom I had received repeated assurances that her orchard should be cleansed of Scale, or destroyed. A few trees had been destroyed, and others had been treated with some nostrum, accomplishing nothing for good, to all appearances. Something more potent than good intentions or good promises is needed; even Paris green or London purple, which some parties I know have thoughtlessly applied, will not exterminate the San José Scale. This orchard was once a fairly good one, doubtless, but is not now worth the effort to save it. So long as it is permitted to remain in this condition, other interests are endangered.

Near by is the very valuable young orchard of W. J. Baker, Esq., which has already been slightly infected by Scales, brought upon the feet of birds or upon the wings of the wind, from that old orchard. Mr. Baker's plant, which is principally apple, gives promise of becoming in the near future a very profitable investment, provided it continues to receive the same watchful care which he has bestowed upon it thus far.

There can be little doubt that the old orchards in this State must very soon be destroyed; and those who now plant apple orchards anew and keep them free from insect pests—a work more easily done than to cleanse them when once infected—will have a source of profit that shall equal or exceed that of any other variety of fruit grown upon our soil; for the apple is now, as it ever has been, the king of fruits.

The fruit farm of C. P. Heald, Esq., I found in fine condition. The older orchard, which was on the place when purchased by Mr. Heald, had been allowed to take care of itself so long that when I first saw it, some two years ago, I confess that I felt that the proprietor had undertaken an unenviable task in making the effort to bring it up into good shape again. Now it was looking clean and thrifty; and its broad, green leaves and fruitful branches gave the keynote to all successful fruit-growing—good cultivation. Without good cultivation even the best climate known and the best soil in the world cannot produce a good orchard and good fruit. Mr. Heald has quite an extensive plant, one to three years old.

Hood River has many other promising orchards not mentioned in this paper, which I must now pass by.

At Mosier, Mr. C. J. Phillips met me at the depot and took me to the orchards along the creek, which, as well as the town, bear the name of an old resident now living at its confluence with the Columbia River. The soil of this section is especially adapted to

the growth of the apple. Here is the orchard of Mr. Root, a successful grower of apples, prunes, cherries, and peaches. Last year, however, his apple crop was seriously injured for the first time with Codlin Moth, having neglected to make preparations to spray until it was too late to save his crop. Already, June 22d, he had sprayed his orchard twice; and after a careful examination, I found only 12 specimens of wormy fruit, each one being strong outside of the calyx. This is not generally the case, but confirms the fact that the egg of the Moth is not always laid in the blossom end of the fruit, as some affirm. Here we found a fair crop of all varieties of fruit except pears, which were light. The Winter Blight was noticeable here and at Hood River in less degree than in most parts of the State, owing doubtless to the higher altitude.

Mr. James Miller's orchard is located on high land, in a very windy exposure. By planting large trees, two or three years old, having stiff stalks, he has succeeded very well in keeping them in an upright position—a thing which it is next to impossible to do with one-year-old trees, even when carefully staked. Early in spring Mr. Miller brought me samples of limbs cut from his orchard, which he feared might be infected with Scale, as they failed to leaf out. The bark was swollen and corrugated, and when cut with a knife both bark and wood were perfectly green, and when left on the tree would remain so until late in the season. This was caused by the winter, trees in the lowest and sheltered places being injured. I advised him to cut back severely; and was gratified to find that all his trees thus treated were putting out new branches and looking well.

Respectfully submitted,

JAMES A. VARNEY,  
Inspector of Fruit Pests.

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## REPORT OF THE TREASURER.

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*To the Honorable State Board of Horticulture—*

GENTLEMEN: I herewith submit for your consideration an account of the Treasurer, R. S. Wallace, from the 1st day of January, 1891, to the date of his death, October 30, 1891.

A discrepancy exists between the amount of balance on hand January 1, 1891, and the balance as it appears by his report as printed in the Biennial Report of the Board, amounting to \$12. This is accounted for by a clerical error made in making the

amount of warrant No. 17 \$225.35, instead of \$237.85, the correct amount, and warrant No. 63 was made \$90.65, instead of \$90.15, which it should have been.

Respectfully yours,

ETHAN W. ALLEN,  
Secretary.

## R. S. WALLACE

IN ACCOUNT WITH

State Board of Horticulture.

DR.

1891.			
Jan	1	To balance cash on hand	\$ 1,251 18
April	16	To cash received from State treasurer	1,750 00
July	16	To cash received from State treasurer	1,750 00
Total			\$ 4,751 18

CR.

1891.				
Jan.	21	By warrant No. 64	\$ 40 00	
Feb.	27	do	14 00	
	27	do	14 00	
	27	do	14 00	
	27	do	92 00	
	27	do	325 55	
	27	do	277 50	
April	18	do	7 00	
	18	do	7 00	
	18	do	157 30	
	18	do	204 90	
	18	do	152 00	
	18	do	141 35	
	18	do	616 00	
	18	do	126 00	
	18	do	175 00	
June	16	do	17 00	
	16	do	7 00	
	16	do	43 67	
	16	do	190 00	
	16	do	335 80	
	16	do	166 80	
	16	do	89 00	
	16	do	160 09	
Oct.	12	do	595 75	
	12	do	150 00	
	12	do	35 00	
	12	do	5 50	
	12	do	319 25	
	12	do	26 00	
	12	do	26 00	
Dec.	3	Cash transferred to H. E. Dosch	261 51	
Total			\$ 4,751 18	\$ 4,751 18

REPORT OF THE TREASURER.

To the Honorable State Board of Horticulture—

GENTLEMEN: I herewith submit for your consideration an account of the moneys received and disbursed by me as your Treasurer from December 3, 1891, to December 31, 1892:

DR.

1891. Dec. 3	To cash received from account of R. S. Wallace -----	\$-----	\$ 261 51
1892. Jan. 6	To cash received from State treasurer -----	-----	1,750 00
June 25	To cash received from State treasurer -----	-----	1,750 00
	Total -----	-----	\$ 3,761 51

CR.

1891. Dec. 5	By warrant No. 95	-----	\$ 191 50
1892. Jan. 11	do 96	-----	96 88
11	do 97	-----	7 00
11	do 98	-----	13 00
11	do 99	-----	79 50
11	do 101	-----	128 00
11	do 102	-----	146 00
11	do 103	-----	10 00
Feb. 2	do 104	-----	113 00
8	do 105	-----	57 75
March 1	do 106	-----	119 00
April 1	do 107	-----	115 15
1	do 108	-----	98 00
11	do 109	-----	21 00
11	do 110	-----	21 00
11	do 111	-----	21 00
11	do 112	-----	94 80
11	do 113	-----	45 80
11	do 114	-----	117 25
11	do 115	-----	18 25
11	do 116	-----	81 00
May 3	do 117	-----	143 75
25	do 118	-----	61 00
25	do 119	-----	29 00
June 1	do 120	-----	124 00
9	do 121	-----	12 50
9	do 122	-----	18 00
23	do 123	-----	50 00
July 1	do 124	-----	124 45
9	do 125	-----	17 25
21	do 126	-----	50 00
Aug. 21	do 127	-----	115 00
Sept. 21	do 128	-----	121 00
Oct. 21	do 129	-----	115 45
13	do 130	-----	92 00
13	do 131	-----	230 00
13	do 132	-----	67 00
13	do 133	-----	120 20
13	do 134	-----	28 00

## CR.

1891.					
Oct.	13	By warrant No. 135	-----	\$	38 00
	13	do	-----		13 55
Nov.	1	do	-----		116 20
	1	do	-----		62 50
	1	do	-----		110 00
	1	do	-----		55 00
	1	do	-----		72 00
	1	do	-----		55 00
	1	do	-----		345 00
Total amount paid out.....					\$ 3,949 30
Total amount received brought down.....					3,761 51
Amount overpaid.....					\$ 187 79

Respectfully submitted,

HENRY E. DOSCH, Treasurer.

## REPORT OF THE SECRETARY.

*To the Honorable State Board of Horticulture—*

In presenting this my second biennial report as Secretary of your honorable Board, I desire to express my hearty appreciation of the continued honor conferred and confidence expressed in continuing me in the important position as Secretary of the Board. There is doubtless no chord in the human breast that responds so pleasantly and satisfactorily as that of approval of one's conduct and work by those with whom we have been associated. The approving sentence, "Well done, good and faithful servant," should be the highest aim and ambition of every human soul. The work of your Secretary during the past two years—like the first two—has not been one of ease, neither has his path been strewn with roses. There have been more bugs and caterpillars in his path than roses; and when a beautiful moth has seemed to flitter along the way to cheer and brighten the surroundings, he has found upon closer investigation that it was the alluring and destructive Codlin Moth out on the rampage in search of the famous "Oregon Red Apples," in which to plant the seeds of destruction and decay.

That the Sixteenth Legislative Assembly did not abolish the Board, as an effort was made to do, or make its work of no effect by taking from it the sinews of war, is, I think, a most fortunate circumstance for the fruit interests of Oregon; and while the appropriation made for the use of the Board was entirely inadequate for them to accomplish the best attainable results, still it has enabled them to keep alive the fires already kindled in horticultural circles,



and to make some advance steps in battling the pestiferous insects that had gained so strong a hold in our orchards before the Board was constituted.

It was found that the 1,000 copies of the First Biennial Report of the Board, published by the State Printer, were scarcely sufficient to supply the demands of the members of the Legislature for them, as this was the first work of the kind ever published in Oregon that contained matters of interest to the fruit-growers; and as it was soon found that a large number would be required to supply the demand for them, not only by the citizens of Oregon, but by those of every State in the Union as well, the Board, at a special meeting, held February 26, 1891, ordered the printing of 10,000 additional copies. Future developments have shown this to have been a wise thing to do, for more than 6,000 of them have been distributed among the fruit-growers of Oregon, and a goodly portion of the remainder have been given or sent to those interested in Oregon horticulture residing in other States.

It was found in some particulars that the law creating the Board was not just what it should be to best enable them to accomplish the work delegated to them; therefore an amendment was proposed by your Secretary, under the advice of the members of the Board, and presented to the Sixteenth Legislative Assembly, which, under the guiding hands of the friends of horticulture found in that honorable body, was adopted February 21, 1891, and an appropriation of \$7,000 for the two years ending December 31, 1892, was made for the use of the Board on the 11th of the same month. Thus strengthened and fortified, the Board entered in upon the work before them with new energy and zeal.

At the special meeting of the Board held February 26, 1891, I was instructed to issue Bulletin No. 5, and in connection therewith print the law as amended, for the instruction and guidance of the horticulturists of the State. The Bulletin is herewith appended. The law as amended will be found in the proper place in the report.

#### BULLETIN NO. 5.

OFFICE OF THE BOARD, }  
 No. 171 SECOND STREET, }  
 PORTLAND, OREGON, March 9, 1891. }

The season of the year is at hand when tree and shrub will take on their new foliage, and with these will come the new-born insect, ready to feed upon and suck the life-blood from the young and tender growth. Later, the apple and pear trees will dazzle the

beholder with their wealth of bloom; and when this shall fall, and the fruit shall lift its young head to catch the warm rays of the sun, it will be sought out by the beautiful but pestiferous Codlin Moth, and used as a fit receptacle for the deposit of her eggs, which produce the worm that, unless destroyed in its infancy, will work destruction to the apple, pear, and quince. These conditions of the tree and fruit are reminders to the vigilant orchardist that the time is at hand for active work, if they are to be saved from these destructive foes.

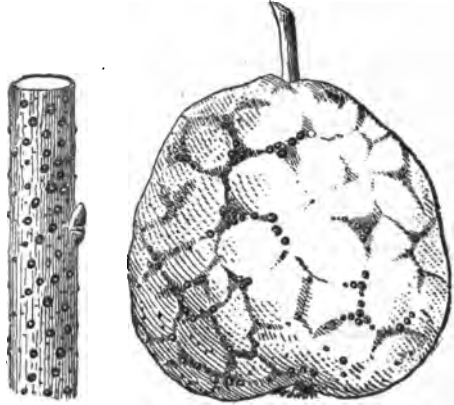
The work of the State Board of Horticulture during the first two years of its existence has been largely one of beginnings; this, to those who are looking for results, is always unsatisfactory. It is, therefore, with no little degree of satisfaction to the members of the commission, that the work of the Board is to be continued, and that the law under which the Board was organized has been so amended as to strengthen and assist the Board in the accomplishment of the work delegated to them. This satisfaction will also, we are sure, be felt by every person in the State who has the true prosperity of the great fruit interest at heart.

It is also very gratifying to the members of this commission that our sister State, Washington, has also adopted a law similar to our own; and we trust the united action of the two may make each the more effective.

The work of the past two years has revealed the fact that nearly all parts of the State are infested with insects that are injurious to the tree and fruit. There are, however, some that threaten the tree and fruit with their dangerous presence to a degree that calls for the most active work on the part of every person who has a tree upon which any one of these has or can be found, to make use of every means possible to exterminate them. Those demanding special attention are the San José Scale, Woolly and Green Aphis, and Codlin Moth. The winter season, when the tree is in a dormant condition, is for many reasons the time when the most effective work can be done in the destruction of the San José Scale and the Aphis, and those who have thus made use of the washes recommended by this Board will find that they have very materially lightened the work of battling them during the spring and summer months. In former bulletins issued by this Board reference has been made to the fact that the San José Scale had been found in two sections of the State. Since then it has been found in other sections, and it is now feared that it has secured a lodgment in nearly all parts of the State, for it is found wherever trees from California have been planted.

### THE SAN JOSÉ OR PERNICIOUS SCALE.

This is without question the most pernicious scale insect known in this country. It infests all the deciduous trees. They have also been found on some of the evergreen varieties. They infest the bark of the trunk and limbs of the tree, also the leaves and fruit. Their presence upon the bark will soon turn the sap part of the wood beneath the bark to a reddish color. Their presence upon the fruit causes it to be covered with bright red spots, and, when badly affected, the fruit shrivels up and cracks open. The scale of the female is circular and flat, gray in color, except the center, which is of a reddish yellow. The scale of the male is black, and is somewhat elongated when fully grown. The full-grown scale is scarcely one sixteenth of an inch in diameter. The eggs are yellow. The young larvæ are very active, and of a pale yellow color, and barely to be seen with the naked eye. The young scales appear like fly-specks. They multiply with great rapidity, there being three broods in one season. The first hatching is usually the latter part of May, the second in July, and the third in September.



The above figures represent a branch and fruit infested by the scale.

The fact that they multiply thus rapidly and infest to the death nearly every variety of tree and shrub, makes their presence in our midst one of great danger, to not only the fruit trees, but to the shade and ornamental trees as well.

#### REMEDIES.

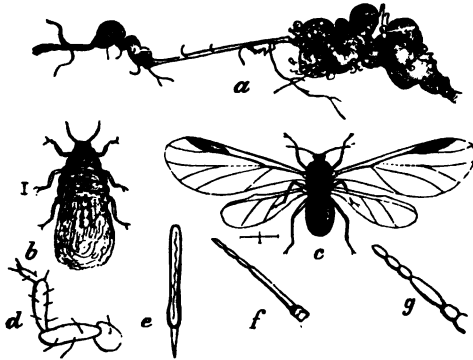
The application of the remedies as recommended in Bulletin No. 4 has proved very satisfactory when properly applied; but the difficulty attending the compounding of these mixtures has been a serious one to overcome when but few trees were to be treated; and therefore the following lye-and-rosin wash has been generally used, and with good effect:

For winter wash—One pound concentrated lye (American or Babbitt's), one half pound of rosin, two and one half gallons of water.

First dissolve the lye in the water, and when thoroughly dissolved, add the rosin, after being thoroughly dissolved by heating; use at a temperature of 100° Fahrenheit. For use when the tree is in foliage, dilute by using ten times the quantity of water. The summer wash is attended with best results when applied when a majority of the insects are hatched out. The first brood generally appears when the cherries are turning color. Badly infested trees should be treated to several applications of the wash, with an interval of ten days.

### THE WOOLLY APHIS.

As stated in previous bulletins, this is without question one of the most dangerous enemies to which the apple tree is subjected.



WOOLLY APHIS (*Schizoneura lausgera*). (After Riley.)  
 (a) An infested root; (b) the larva—color, brown; (c) winged adult—colors, black and yellow; (d) its legs; (e) its beak; (f) its antenna; (g) antenna of the larva; all highly magnified.

This insect is of dark russet brown color with abdomen covered with a white down of a cottony appearance. It attacks the roots, trunks, and branches of the apple tree; it does not affect the leaves or fruit. It infests nearly every orchard and nursery in Western Oregon, and may be found in some of them in the Eastern part of the State. They seem to be very tenacious of life, and just how our orchards are to be entirely freed from them is a problem yet to be solved.

### REMEDIES.

The lye-and-rosin wash recommended for the destruction of the San José Scale is the best yet found in battling the Woolly Aphis, both in winter and summer. When they are found infesting the roots, remove the earth, and apply scalding-hot a strong lye or tobacco solution. Nursery stock may be dipped in water having a temperature of 150°. Mulching about trees is said to bring the lice nearer the surface. Ashes placed about the base of the tree will prevent migration from root to top, and *vice versa*.

### THE GREEN APHIS.

During the winter there may be found upon the bark of the twigs of the trees, and also about the base of the buds, a number of very minute, oval, shining, black eggs. These are the eggs of the Green Aphis. These eggs are deposited in the autumn, and when first laid are of a light yellow or green color, but gradually become darker and finally black. As soon as the buds begin to expand in the spring, these eggs hatch very tiny lice, which locate themselves upon the swelling buds and the small tender leaves, and, inserting their beaks, feed upon the juices. All of the lice then hatched are females, and reach maturity in ten or twelve days, when they commence to give birth to living young, producing about two daily for two or three weeks, after which the older ones die. The young locate about the parents as closely as they can stow themselves, and they also mature and become mothers in ten or twelve days, and are as prolific as their predecessors. They thus increase so rapidly, that as fast as new leaves expand, colonies are ready to occupy them. As the season advances, some of the lice acquire wings, and, dispersing, found new colonies on other trees. When cold weather approaches, males as well as females are produced, and the season closes with the deposit of a stock of eggs for the continuance of the species another year. The leaves of the trees infested by these insects become distorted and twisted backward, often with their tips pressing against the twig from which they grow, and they thus form a covering for the Aphis, protecting them from rain. An infested tree may be distinguished at some distance by this bending back of the leaves and young twigs. It is stated that the scab on the apple often owes its origin to the punctures of the plant lice.

### REMEDIES.

Very much can be accomplished in the destruction of the eggs that have been deposited upon the bark of the trees during the winter months while the trees are in a dormant condition, by washing or spraying them with a solution of lye-water, made by dissolving one pound of American or Babbitt's concentrated lye in two and one half gallons of water, care being observed not to use this strength of wash after the buds have commenced to swell. This strength of wash will also remove the moss from the limbs and bark of the tree, as well as destroy the larvæ of the Codlin Moth which may be reached by it. A frost occurring after a few days of warm weather will kill millions of them. In the egg state the insect can endure any amount of frost, but the young Aphis quickly perishes when the temperature falls below the freezing point.

The Lady Bird or Lady Bug is one of the most beneficial of the insect tribes to the horticulturist, from the fact that they prey on other insects in all stages of their growth, from the larvæ to the perfect beetle. These should be propagated and protected as far as possible in orchards affected with the Aphis, for myriads of them are devoured by the Lady Birds and their larvæ.

There are a number of solutions that will operate successfully in exterminating the Aphis, and can be used as most convenient to be procured. The merit of these solutions is considered in the order named:

“Two pounds of rosin; three pounds of sal soda, or one of concentrated lye; water to make thirty-six pints. Dissolve the sal soda or lye in a few pints of water. When thoroughly dissolved, add the rosin. Heat until dissolved, and add water finally. Use one and one half pints solution to the gallon of water. Use at a temperature of one hundred degrees Fahrenheit.”

The following formula comes to us from the Department of Agriculture, Washington:

“Take two pounds of common or whale-oil soap; one gallon water; heat this solution and add it boiling hot to two gallons kerosene oil; churn this mixture by means of a force pump for ten minutes. The emulsion, if perfect, forms a cream, which thickens on cooling and should adhere without oiliness to a surface of glass. Dilute before using, one part of the emulsion to nine parts of cold water.”

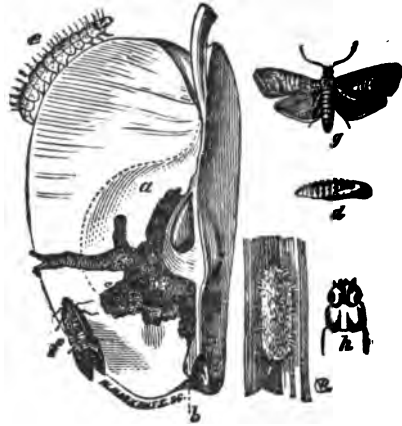
“Take five pounds of leaf tobacco and boil it from two to three hours in twenty gallons of water. Take one gallon of common soft soap and boil it in ten gallons of water until thoroughly mixed; add the two together and strain.”

Apply any of the mixtures by means of a spray pump as soon as the eggs begin to hatch, and continue the treatment as long as there is one Aphis to be found.

#### THE CODLIN MOTH.

The description and habits of this enemy of the apple, pear, and quince have been fully given in previous Bulletins issued by this Board, and his personal acquaintance has, doubtless, been formed by nearly every orchardist in the State, so that no extended description of the Codlin Moth need be given here. The illustration shows the moth in its different stages of development from the cradle to the grave, and the question to be solved is, How to make his cradle also his grave? The fighting of this insect must be

principally done in the spring and summer. The winter work must consist in the destruction of as many cocoons as possible. This can be done in the orchard by scraping the rough bark from the tree and spraying it with a strong lime solution. All places beneath or about the tree where a cocoon could be hid away should be examined. All apple boxes in which infested fruit has been placed should be submerged in boiling-hot water, and all places where infested fruit has been stored should be carefully examined and every cocoon destroyed. As each moth is capable of laying not less than fifty eggs, it will be at once seen that every one that is thus destroyed in the chrysalis state is destroying as good as fifty worms.

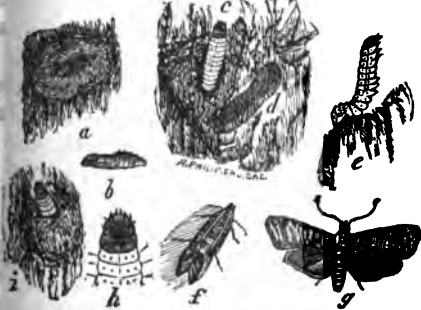


The puncture made by the moth is represented at b, the borings of the larva at a, the mature worm at c, the moth with wings closed at f, the moth with wings expanded at g, and the cocoon at i, d the chrysalis, and h the anterior part of the body, magnified.

REMEDIES.

It has certainly been very gratifying to hear of the beneficial results that have attended the use of the spraying washes during the past season. On all occasions

where the spraying was continued late into the summer, from seventy to ninety per cent of the fruit was saved free from worms. Nothing has been found to take the place of the arsenical mixtures, London purple or Paris green, used last season. Where pumps are so arranged that the wash can be kept constantly agitated, there seems to be no question but what the Paris green is a little more effective, and not as liable to damage the foliage as is the



(a) Nest of larva on outside of tree, under the old bark; (b) pupa; (c) larva exposed from nest; (d) old nest; (e) larva about to build nest; (f) the moth at rest; (g) moth with wings spread; (h) head of larva.

London purple. While London purple is much more soluble than is Paris green, and is on that account to be preferred, still the diffi-

culty of getting it at a uniform strength makes the use of it a little uncertain as to the quantity that should be used.

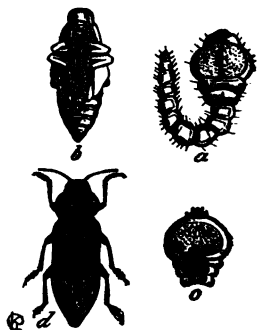
The experience of the past season leads us to conclude that one pound of either to 200 gallons of water is of sufficient strength to accomplish the work.

#### WHEN TO APPLY.

The best and most opportune time to commence spraying the tree is soon after the fruit is set, and when it is about the size of a small pea; and this should be continued with an interval of two weeks until the middle of June on early varieties, and until September on late ones.

#### APPLE-TREE BORER.

Of these there are a number of species. The two-striped, or round-headed, is extremely destructive to apple orchards, from the borings of the grub into the wood of the trees. The mature beetle appears during May and June, and being strictly nocturnal, is seldom seen except by those who hunt for it. The female deposits her eggs mostly in June, in the bark near the foot of the tree, and also in the forks of the main branches. The eggs hatched, the minute grubs commence boring into the wood, generally downward the first year, and upward and near the bark the second year. The Borer lives in the wood of the tree until the third year, when it emerges as a perfect beetle. It infests healthy as well as unhealthy trees, and is very destructive. The Flat-headed Borer, while working in the same class of trees, is totally unlike the other, boring an oval hole twice as wide as high. The beetle flies by day instead of at night, and besides the apple tree, attacks the oak, peach, soft maple, ash, willow, tulip, and even the elm and cottonwood; it also attains its full size in one year from the egg. This Borer attacks limbs and trunk indiscriminately.



#### REMEDIES.

The natural enemies of these insects are the birds of the wood-pecker tribe.

Artificial remedies are, to find the cast of the larvæ, and kill them by piercing with a flexible wire. Prevention is, however, the only sure remedy. Keep the base of every tree clear of weeds and trash, and apply a solution of soft soap reduced to the consistence of a thick



paint by the addition of a strong solution of washing-soda in water. This, if applied to the bark of the tree, especially about the base or collar, and thence up the trunk and over the larger branches, will dry in a few hours and form a tenacious coating not easily dissolved by rain. This soap solution should be applied in May, and a second time the latter part of June. The moth may be prevented from laying her eggs upon the tree by placing stiff paper, about a foot high, around it, the bottom extending some two inches below the surface, and fastening the top with a string or wire.

#### THE APPLE-TREE CATERPILLAR.

There are several varieties of these insects so like in appearance and unlike in habits that much confusion is occasioned in trying to distinguish between them. These caterpillars are seldom abundant for many years in succession, for in times of great plenty their natural enemies multiply with great rapidity. Several parasites destroy them, and some of the insect-feeding birds devour them greedily.

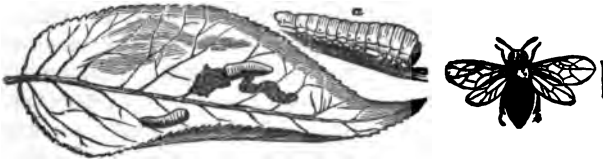
#### REMEDIES.

The egg-clusters should be sought for and destroyed during the winter months. When the caterpillars have become half grown, the trees should be frequently inspected early in the morning, and the congregated masses destroyed by trickling a little kerosene oil over them. Trees can be thoroughly cleaned of them by the use of the London-purple spray as used for the destruction of the Codlin Moth, or three spoonfuls of Onegarth's Insecticide dissolved in a pailful of water, and the trees sprayed with this solution. During the day they are so constantly on the move, that a tree thoroughly cleansed from them in the morning may be crowded again before night; so, to avoid this, fasten strips of cotton-batten four inches wide about the trunk of the tree, by means of a string tied tight in the middle.

We desire to emphasize the fact that one hour spent in the orchard destroying the eggs or the young Caterpillars when first hatched, will accomplish more than one day after they are large enough to scatter from the home nest. The successful orchardist is he who watches every tree for the first appearance of every insect that will be injurious to it.

#### THE PEAR AND CHERRY-TREE SLUG.

Pear and cherry growers should be on the lookout for this destructive pest about the middle of June, and again early in August, and



A shiny, olive green worm, half an inch long when full grown.

if the young slugs are then abundant, they should be promptly attended to, since if neglected they soon play sad havoc with the

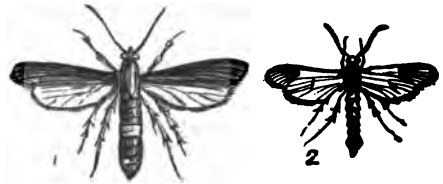
foliage, feeding upon the upper side of the leaves and consuming the tissues, leaving only the veins and under skin. The foliage deprived of its substance, withers and becomes dark colored, as if scorched by fire, and soon afterward it drops from the tree. Trees badly infested often become as bare of foliage in July as they are in January. In such cases, the tree is obliged to throw out new leaves, and this extra effort so exhausts its vigor as to interfere seriously with its fruit-producing powers the following year. Although very abundant one season they may be very scarce the next, as they are liable to be destroyed in the interval by enemies and by unfavorable climatic influences.

#### REMEDIES.

London purple or Paris green mixed with water in the proportion of one ounce to six gallons, and applied to the foliage with a syringe or a spray pump, promptly destroys this slug. Fresh air-slaked lime, sand, ashes, or road dust, dusted on the foliage, is said to be an efficient remedy; but these latter are unsatisfactory measures and usually of little value.

#### THE PEACH-TREE BORER.

This notorious pest, so destructive to peach orchards, is very widely disseminated. The moth appears from about the first of June to the middle of September. The sexes differ very much in appearance. In the figure herewith, No. 1 represents the female and No. 2 the male. The female is much the larger, and has a broad, heavy abdomen. The body is of a glossy steel blue color, with a purplish reflection and a broad band of orange yellow across the abdomen. When the wings are extended, the moth measures about an inch and a half across. The male is about two thirds the size of the female.



The female deposits her eggs in the bark of the tree at the surface of the ground. They are very small, oval in form, slightly

flattened; and of a dull yellowish color. They are deposited singly and fastened to the bark by a gummy secretion. As soon as the worm is hatched, it works downward in the bark of the root, forming a small winding channel, which soon becomes filled with gum. As it increases in size it devours the bark and sap-wood, and causes a copious exudation of gum, which eventually forms a thick mass around the base of the tree, intermingled with the castings of the worm. When full-grown, the worm measures over half an inch in length and about a quarter of an inch in diameter. It is a naked, soft, round grub, of a pale whitish color, with a reddish, horny-looking head and black jaws. In badly-infested trees the whole of the bark at the base of the tree is sometimes consumed for an inch or two below the surface. Nor does the insect always confine itself to the base of the tree; it occasionally attacks the trunk farther up, and sometimes the forks of the limbs. But exuding gum invariably points out the spot where the enemy is at work. Its operations are not always confined to the peach; it also works on the plum.

#### REMEDIES.

Several remedies have been proposed to meet this evil. Where the borers are present, they are easily detected, in consequence of the exudation of gum. Hence, early in the spring the trees should be examined, a little of the earth removed from about the base of the tree, and if masses of gum are found, the grub should be searched for and destroyed. Hot water has been found to be very effectual in killing them. It should be used boiling hot, and after the earth has been removed from about the base of the tree.

Among the preventive measures, much has been written in favor of mounding the trees, banking the earth up around the trunk to the height of a foot or more, and pressing it firmly about the tree. Some allow the mounds to remain permanently; but the better way is to mound up late in the spring, and level off the ground again in September, after egg-laying has ceased and the moth has disappeared. Another preventive, which we regard as much better than mounding the trees, is the use of stiff paper, one foot high, about the base, extending some two inches below the surface and fastened at the top with a string or wire. The washes recommended for the Apple-tree borer are also good to be used on the peach.

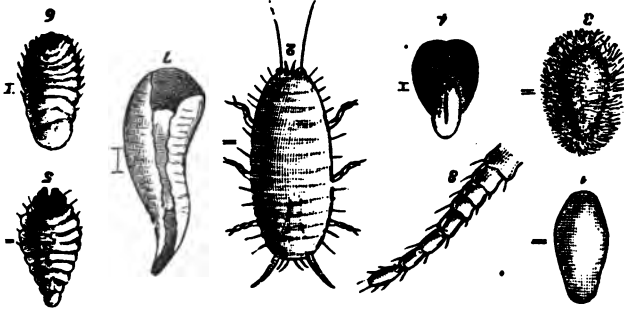
#### THE OYSTER-SHELL BARK-LOUSE.

This scale is of a brownish or grayish color, about one sixth of an inch in length, nearly the color of the bark of the trees, and in

shape resembles the shell of an oyster—hence its name. In some instances the branches and trunks of the trees become literally covered with these scales.



Under each scale, as shown in the accompanying figure, at 1 may be found a mass of from twenty to one hundred eggs.



In May or early June, and in September, they hatch, and appear as shown, highly magnified, at 2. In a few days a fringe of delicate, waxy threads issues from

their bodies, as seen at 3. Gradually the insect assumes the form shown at 4; 5 and 6 represent the larvæ as nearly full grown, and when detached from the scale. Before the end of the season the louse has secreted for itself the scaly covering shown at 7, in which it lives and matures.

#### REMEDIES.

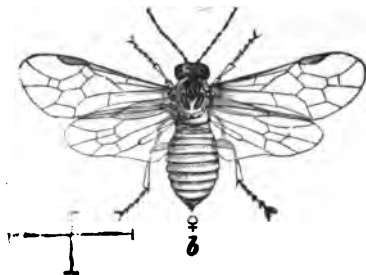
The rosin-and-lye wash recommended for the San José Scale will be found effective; also strong solutions of soap or tobacco.

#### THE IMPORTED CURRANT-WORM.

This worm is doing some damage in some parts of the State, and if not checked when found, they soon strip both currant and gooseberry bushes of their leaves, and the partially grown fruit shrivels and dies. By the prompt use of white hellebore, London purple, or Paris green, this pest may be eradicated. Use one tablespoonful of either dissolved in a pailful of water, applying it with a syringe



or watering pot, the object being to wet every leaf. The full grown worms are about three fourths of an inch long, and are shown at *a*; *b* gives the position of the black spots upon a magnified joint of the body. The perfect female insect is shown in the above figure, the lines showing the actual size.



#### THE CURRANT-FLY.

This insect has made its appearance in many localities, and in some gardens has entirely ruined the gooseberry and currant crops. In its perfect state it is a small, two-winged fly, which lays its eggs on the fruit while it is small; the larvæ enters it while yet green, and feeds on its contents, leaving a round, black scar at the point of entry.

The affected fruit ripens prematurely, and shortly decays and drops to the ground, when, on opening them, a small white grub will be found, about one third of an inch long.

#### REMEDY.

“Use one large tablespoonful of powdered white hellebore dissolved in a pailful of water, spraying the bushes just before the bloom, and again soon after the fruit sets.”

Six thousand copies of these Bulletins were printed and distributed among the fruit-growers throughout the State. Later in the season it was found that some active steps would have to be taken to prevent the importation of insects injurious to our orchards on fruit that was being shipped into our markets; so President Cardwell convened the Board in special meeting in the office of the Board on June 15, 1891, and the Secretary was authorized and instructed to send out the following circular letters:

#### CIRCULAR LETTER.

PORTLAND, OREGON, June 15, 1891.

It is found that scale insects of various kinds that are very dangerous to the fruit interests of the State are being brought into the State on fruit shipped from California and elsewhere. The future fruit interests demand that this shall be prohibited; and as the law under which this Board is working authorizes and requires that this shall be done, this is, therefore, to notify you officially that you

will not be allowed to dispose of in any way any fruit infected with insects that are injurious to fruit or fruit trees, under penalty of sections 6 and 8 of the law, a copy of which is herewith inclosed.

Truly yours,

E. W. ALLEN, Secretary.

### CIRCULAR LETTER.

PORTLAND, OREGON, June 15, 1891.

It is the desire of the members of the State Board of Horticulture that not only shall every available means be taken to exterminate the insect pests that now infest our orchards, but also to make use of the very best means to prevent the importation of any more on fruit and trees shipped into the State from other States infected not only by those which we now have, but by many exceedingly destructive ones which we now have not; and also to take all necessary precautions that those we have are not distributed in like manner over parts of the State not now infected. To this end we urgently ask your hearty coöperation. And that you may have at hand that portion of the law under which this Board is working, which defines the manner of procedure, and the penalties of not complying with them, I herewith print the same, viz:

Section 6. For the purpose of preventing the spread of contagious diseases among fruit and fruit trees, and for the prevention, treatment, cure, and extirpation of fruit pests and the diseases of fruit and fruit trees, and for the disinfection of grafts, cions, or orchard *débris*, empty fruit boxes or packages, or other suspected material or transportable articles dangerous to orchards, fruits, and fruit trees, said Board may suggest regulations for the inspection and disinfection thereof, which regulations shall be circulated in printed form by the Board among the fruit-growers and fruit-dealers of the State. And it shall be the right and duty of every member, or officer or appointee of said Board to inspect any fruit or fruit packages, or any trees, plants, cuttings, grafts, or cions, imported or brought into this State, known or believed to be infected by any insect or insects, or the germs thereof, or by eggs, larvæ, or pupæ thereof, or with any contagious disease injurious to fruit or fruit trees. And any person who shall sell, give away, distribute, or transport, or offer to sell, give away, distribute, or transport, any such fruit, fruit packages, trees, plants, cuttings, grafts, or cions, found upon such inspection, or known to be infected as aforesaid, before the same are disinfected, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished as provided for in section 8 of this Act. And any person shipping

any fruit trees, cions, cuttings, or plants, from any orchard, nursery, or other place where they were grown or produced, shall place upon or securely attach to each box, package, or parcel containing such fruit trees, cions, cuttings, or plants, a distinct mark or label showing the name of the owner and shipper of the same, and of the locality where produced. And any person who shall ship, transport, or remove, or cause to be shipped, transported or removed any fruit tree, cions, cuttings, or plants, found upon inspection as aforesaid, or known to be infected as specified in this Act, before the same is disinfected to the satisfaction of some member, or officer, or appointee of the Board, shall be deemed guilty of a misdemeanor, and upon conviction shall be fined as provided for in section 8 of this Act. And it shall be a misdemeanor, punishable as aforesaid, for any person to ship or transport from one locality to another any fruit trees, cions, cuttings, or plants that have been disinfected, without a stamp or label on the box, package, or wrapping thereof, showing such disinfection. And any person who shall use any false or counterfeit stamp or label as aforesaid, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined as provided in section 8 of this Act. And the Board shall have power to make such temporary appointments as may be necessary to carry out the provisions of this section.

Section 8. Whenever complaint is made to any member of the Board that any person has an orchard, trees, or nursery of trees, or a fruit-packing house, storeroom, salesroom, or any other place in this State infected with any noxious insects, or the egg or larvæ of any such insects, injurious or that may become injurious to the fruit interests of the State, such member shall inspect or cause to be inspected the premises or property to which such complaint relates; and if the same is found to be infected as aforesaid, such member shall notify, in writing, the person having charge of such premises or property to appear before him at a certain time and place to be specified in such notice, to be heard in reference to the infection of such premises or property as aforesaid. And if such member, after hearing the person in charge of such property, shall be of the opinion that such premises or property, or any of the same, is infected as aforesaid, he shall notify, in writing, the person in charge of the same, within a time to be prescribed in such notice, to treat and disinfect said premises or property in the manner prescribed in such notice. And if the person so notified shall neglect or refuse to treat and disinfect said premises or property in the manner and within the time prescribed in said notice, such person shall be fined not less than twenty-five nor more than one hundred dollars. And if it appears upon the trial that if any orchard, trees, nurseries.

buildings, or other structures, premises, or property, in charge of the defendant, referred to in said notice, or any part of such structures, premises, or property, is infected as aforesaid, the court shall declare whatsoever of the same is so infected a nuisance, and shall order it to be abated, or may make any other order necessary to prevent its continuance; and it shall be the duty of the Board, or some member thereof, to execute such order; and the costs and disbursements of the prosecution shall be adjudged against the party convicted as aforesaid.

It is impossible, with the limited means appropriated for the use of the Board, that all parts of the State can be reached by the Inspector of Fruit Pests or any one of the Commissioners. It is therefore very important that every one interested in this most important work should join hands with them in the enforcement of the law, and everyone not only attend to the compliance with it in his own orchard, nursery, or store, but to see that his neighbor does the same, and if they are not, report the name of such to some member of the Board or me at once.

E. W. ALLEN,  
Secretary.

The first of these was sent out to every merchant in and about Portland, and also in other parts of the State, so far as their names could be secured, that were dealing in green fruits. A copy of the second was also enclosed; and in addition thereto a copy was sent to every fruit-grower in the State, so far as I have been able to secure their names. These were followed up by active work on the part of Fruit Inspector Varney and myself; and several hundred boxes of fruit of various kinds found to be infected with the San José Scale were condemned, and either returned to the shipper or destroyed. This work has since been prosecuted with as much vigor and diligence as the limited means at the disposal of the Board would admit. When one counts up the number of those that sell fruit in and about Portland alone—say nothing about the rest of the State—then one will begin to realize the amount of work necessary to look after this branch of the work. Instead of being obliged to look after all of this alone, as I have had to do, there should be a quarantine officer employed, who should have at least a half-dozen assistants during the months of June, July, August, September and October, when fruit is being shipped into the Portland market from all parts of the Pacific Coast. The distribution of the circular letters in connection with the work of personal inspection that we have been able to do, has not accomplished all that should have been done; still it has had a most beneficial effect, in that it



has very largely reduced the "importation and distribution of insect pests upon fruit and trees shipped in from infected districts."

At the regular semi-annual meeting of the Board, in October, General Varney notified the Board that owing to the fact that he had accepted the presidency and general management of the Chenowith Fruit Park Association, located in Douglas County, this would necessitate his moving out of the district which he was representing upon the Board, and that he had, therefore, sent in his resignation as a Commissioner to Governor Pennoyer; and as his time would be wholly occupied in the duties of his new position, that it would be impossible for him to serve the Board longer as Inspector of Fruit Pests. Owing to the limited amount of money in the treasury of the Board, it was deemed best to make no appointment to fill the vacancy thus occasioned in the office of Inspector of Fruit Pests, but that the work should be done so far as possible by each Commissioner in the district represented by him.

On the 30th of October, 1891, after an illness of just one week of pleuro-pneumonia and inflammation of the bowels, Commissioner R. S. Wallace died. His death was so sudden and unexpected that the news of it came as a sudden shock to all who knew him. On the 23d of November, President Cardwell convened a special meeting of the Board in consequence of the death of Commissioner Wallace. Henry E. Dosch was elected Treasurer of the Board to fill the vacancy caused by the death of Commissioner Wallace, and at which meeting Secretary Allen presented the following resolutions in honor of the memory of R. S. Wallace, deceased, which were unanimously adopted; and the Secretary was instructed to have them engrossed and sent to the family of the deceased. (The resolutions will be found on Special Memorial page in the front of this report.) At this meeting the Secretary was instructed to issue Bulletin No. 6, giving the formulas for winter washes, and the necessary instructions for their proper use and application. In accordance therewith I issued the following:

#### BULLETIN NO. 6.

OFFICE OF THE BOARD, }  
 No. 171 SECOND STREET, }  
 PORTLAND, OREGON, December 1, 1891. }

At this season of the year, when many trees are being transplanted from nursery to orchard, it is of absolute importance that the greatest care should be exercised in seeing that all trees thus transferred are free from insects and fungi that are injurious. Many of our orchards and some of our nurseries are thus infected, and it

is the duty and earnest desire of this Board that everything shall be done to not only keep the pests that now infest our orchards and nurseries from spreading, but to do all in our power to eradicate them. To this end we desire to caution all citizens of the State not to purchase any trees, shrubs, cuttings, or cions without first ascertaining if they are free from insects or fungous pests. To this end, no trees, cions, or shrubs should be purchased from any nursery or orchard located in districts affected with any injurious insect or fungus unless they have positive knowledge that such trees, cions, or plants have been thoroughly disinfected.

The special attention of all horticulturists is called to the danger of introducing into the State the fatal Peach Yellows that infests large districts in the East where peaches are grown. This deadly disease of the peach is liable to be brought into the State on peach trees, stock for budding purposes, and in use of peach pits for growing stock. The danger is so great that we deem it advisable that all importations as above should be prohibited from Eastern districts affected with this disease of the peach.

The Board desires again to call the attention of every person interested in the welfare of the fruit industry to the San José Scale, which infests many of our orchards and some of our nurseries. This Scale, unless checked in its ravages, will do untold damage to the fruit interests of Oregon. This pest is to the orchard what the smallpox is to the family, and should be as anxiously and as thoroughly treated. There seems to be an indifference among the people on these most important and vital matters that is simply alarming. Owners of orchards and some of our nurserymen are seemingly perfectly indifferent to what pests and diseases they spread in the sale of trees; and to a great extent this is also true of those who are purchasing trees for planting new orchards.

#### THE SAN JOSÉ, OR PERNICIOUS SCALE.

This is without question the most pernicious Scale insect known in this country. It infests all the deciduous trees. They have also been found on some of the evergreen varieties. They infest the bark of the trunk and limbs of the trees, also the leaves and fruit. Their presence upon the bark will soon turn the sap part of the wood beneath the bark to a reddish color. Their presence upon the fruit causes it to be covered with bright-red spots, and, when badly affected, the fruit shrivels up and cracks open.

The Scale of the female is circular and flat, gray in color, except the center, which is of reddish yellow. The Scale of the male is black, and is somewhat elongated when fully grown. The full grown Scale is scarcely one sixteenth of an inch in diameter. The

young larvæ are very active, and of a pale yellow color, and barely to be seen with the naked eye. The young Scales appear like fly-specks. They multiply with great rapidity, there being three broods in one season. The first hatching is usually the latter part of May, the second in July, and the third in September. The fact that they multiply thus rapidly and infest to the death nearly every variety of tree and shrub, makes their presence in our midst one of great danger, to not only the fruit trees, but to the shade and ornamental trees as well. The eggs are yellow.

#### REMEDIES.

The following remedies have been found effective in destroying the Scale, when well prepared and thoroughly applied:

No. 1—Twenty-five pounds of lime (unslacked); 20 pounds of sulphur; 15 pounds of salt; 60 gallons water. To mix the above, take 10 pounds of lime, 20 pounds of sulphur, and 20 gallons of water. Boil until the sulphur is thoroughly dissolved. Take the remainder—15 pounds of lime and 15 pounds of salt—slack and add enough water to make the whole 60 gallons. Strain and spray on the trees, milkwarm or warmer. This can be applied when the foliage is off the tree, and will have no injurious effect on the fruit-buds or tree whatever.

No. 2—For winter wash—One pound of concentrated lye (American or Babbitt's); one half pound of rosin; two and one half gallons of water. First dissolve the lye in water, and when thoroughly dissolved, add the rosin, after being thoroughly dissolved by heating; use at a temperature of 100 degrees Fahrenheit.

#### THE WOOLLY APHIS.

As stated in previous bulletins, this is without question one of the most dangerous enemies to which the apple tree is subjected. This insect is of dark russet brown color, with abdomen covered with a white down of cottony appearance. It attacks the roots, trunks and branches of the apple trees; it does not affect the leaves or fruit. Affected roots are readily recognized by the presence of small, irregular wart-like excrescences or knots which, upon being cut open, show peculiar wavy, dotted, and penetrated grain. It infests nearly every orchard and nursery in Western Oregon, and may be found in some of them in the eastern part of the State. They seem to be very tenacious of life, and just how our orchards are to be entirely freed from them is a problem yet to be solved.

## REMEDIES.

The lye-and-rosin wash recommended for the destruction of the San José Scale is the best yet found in battling the Woolly Aphis. When they are found infesting the roots, remove the earth and apply scalding hot, a strong lye or tobacco solution. Nursery stock may be dipped in water having a temperature of 150 degrees. Mulching about trees is said to bring the lice nearer the surface. Ashes placed about the base of the trees will prevent migration from root to top, and *vice versa*.

## VALUE OF WINTER WASHES.

There is no question but that the winter season in Oregon is the opportune time for washing and spraying the orchard. The trees at this season are in a dormant condition, and a much stronger solution can now be used than when the foliage is on the tree; the trees are also free from everything that will interfere with the work in reaching the parts with the wash where the eggs or larvæ of the insects have been deposited during the last few months upon the various parts of the trees, and no fear need be had in using the strong washes, if not used after the fruitbuds begin to swell, believing that more can be accomplished by one good, thorough spraying of the trees during the next sixty days with either of the above washes than can be by five sprayings after the foliage is upon the trees.

## SPECIAL TO NURSERYMEN.

One of the great dangers to the future fruit interests of Oregon is that trees infected with San José Scale or Woolly Aphis will be sent out from our nurseries without having been properly and thoroughly disinfected. No nurseryman can afford to allow a single tree to go out from his nursery thus infected, for the result will be very disastrous to the future trade of any such nursery. But aside from this fact, this Board positively requires that all nursery stock when infected shall be thoroughly cleansed by immersing the trees in a hot solution of whale-oil soap and lye. It has been found that the larger proportion of the apple root graft stock brought from the Eastern nurseries are infected with the Woolly Aphis, and whoever have purchased this kind of stock from the East are cautioned to make a close investigation of the same before it is shipped out.

Five thousand copies of these bulletins were printed and sent out to the fruit-growers of the State, and the work of inspecting

orchards and urging upon all who were owners of those that were found infected with insect pests to take active steps to eradicate them, was pushed in all parts of the State by your Secretary and the different members of the Board.

A special meeting of the Board was held in Portland January 11th, in connection with the regular quarterly meeting of the State Horticultural Society. At this meeting your Secretary was instructed to rent a new office at No. 272½ Stark street for the greater convenience and efficiency of the work of the Board.

Very much good was accomplished in all parts of the State during the winter months among the orchards in the use of the winter washes, fully demonstrating the value of this kind of work while the foliage is off and the trees are in a dormant condition; and more especially was this true where the San José Scale had secured so effective a hold among the fruit and ornamental trees in the fine grounds in and about Portland. Here very much has been accomplished in checking the onward march of this truly pernicious Scale. April 11th, the Board convened in its regular semi-annual meeting at Grants Pass. Mr James Hendershott, having been appointed to succeed himself as Commissioner for the Fifth District, and R. D. Allen of Silverton, having been appointed to fill the vacancy occasioned by the death of R. S. Wallace as Commissioner for the Second District, and C. P. Heald, having been appointed to fill the vacancy occasioned by the resignation of James A. Varney as Commissioner for the Fourth District, for a period of four years each from April 1, 1891, and each having duly qualified, took their seats as members of the Board. At this meeting very interesting reports were made by each and all of the Commissioners relative to the work that had been done and the favorable outlook for the future. A very interesting and valuable meeting of the State Horticultural Society was held at Grants Pass the day following the meeting of the Board, and much good was done to the fruit interests of that section in the deliberations of these two bodies in their midst. At this meeting the Secretary was instructed to issue Bulletin No. 7, giving the formulas for and instructions regarding summer work in the orchard, which was complied with in the following form, and more than five thousand of them were printed and distributed among the fruit-growers of the State:

## BULLETIN NO. 7.

## INSECTS TO BE COMBATTED AND WASHES TO BE USED.

The San José Scale, the Oyster-Shell Scale, the Woolly Aphis, the Green Aphis, the Plum Aphis, the Hop Aphis, the Cherry and Pear Slug, the Caterpillars, and in fact all insects injurious to trees, shrubs, plants, vines, and their foliage, can be combatted with the same washes, with satisfactory results, during the summer months. When any of these insects pass from their dormant condition in the spring, they are very susceptible to any of the following washes, which, if properly prepared and thoroughly applied, will be effective in their work. For full descriptions of the above insects, as well as others mentioned in this Bulletin, the reader is referred to previous Bulletins issued by this Board. The Aphis insects generally appear with the opening bud and leaf in early spring, while Scale and other of the pestiferous insects named above do not hatch their young until several weeks later; it will be necessary therefore for the orchardist to keep vigilant watch for the first appearance of any injurious insects upon his trees through the spring and summer.

## REMEDIES.

The kerosene emulsion, because of its cheapness, ease of preparation, and effectiveness, is the most valuable of the substances that kill by external contact. There is no insect that it will not kill if applied in sufficient strength. Great caution must be observed, however, in making the emulsion, to churn the mixture by means of a force pump, or otherwise, a sufficient length of time so that the oil, soap, and water shall be so thoroughly mixed that they will not separate when left to stand. There are two or three ways of making this emulsion, but the following formula comes to us from the Department of Agriculture, Washington:

## KEROSENE EMULSION.

Take two pounds of whale-oil soap; one gallon water; heat this solution, and add it boiling hot to two gallons of kerosene oil; churn this mixture by means of a force pump, or otherwise, for ten minutes, or until a perfect emulsion is formed. The emulsion, if perfect, forms a cream, which thickens on cooling and should adhere without oiliness to a surface of glass. Dilute before using, one part of emulsion to nine parts of water.

## ROSIN-SOAP WASH.

The following rosin-soap wash has been used with good effect as a summer wash in the destruction of the San José Scale in some parts of the State: Take one pound of concentrated lye; two pounds of rosin; one pound of tallow; three gallons of water. Boil the same as common soap. Use one quart of this to three gallons of water. If found too strong for the foliage, add more water.

## WOODBURY IMPROVED ROSIN-WASH.

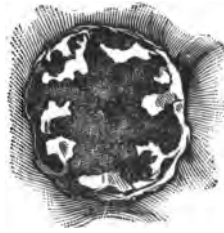
This is manufactured in San Francisco, and is highly endorsed by the fruit-growers in California, and has also been tested and recommended by members of this Board as a most valuable wash. Put up convenient for use.

## THE I X L COMPOUND.

This compound, manufactured in San Francisco, is endorsed by a large number of the horticulturists of California as being a valuable wash for the destruction of the San José Scale, and also for all pernicious insects affecting plant life.

## FUNGOID DISEASES.

Fungus attacks all plants, especially those in a more or less diseased or disorganized condition. It is propagated by spores, minute grains which perform the functions of seed. The fungoid diseases of fruit and fruit trees rank next in the list of destructive agents to the damage done by injurious insect pests. The



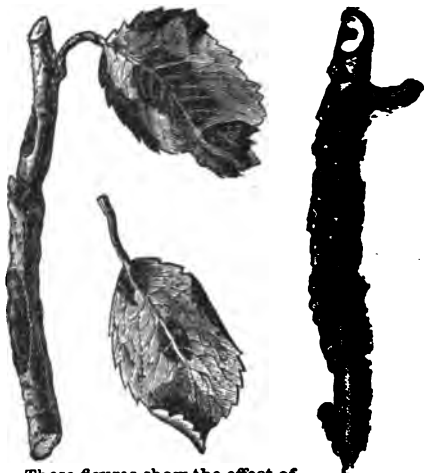
The above figures show the work of the Black Spot or fungus on the apple. *a*, the fruit as it appears when affected, *b*, a single blotch enlarged; the center is black with millions of growing Spores; both show the rapid spread of the fungus, destroying the tissues of the apple.

fruit interests of the East has suffered large losses from the attacks of fungi. The most conspicuous of these has been the Peach Yellows which has caused the loss, by the disease and in the effort to root it out, of hundreds

of thousands of peach trees. Fortunately for Oregon, this deadly disease of the peach has not made its appearance as yet in our

orchards. Certain forms of these diseases have appeared in different portions of the State, in the pear and leaf blight and black spots upon the apple and pear.

These disease produce a form of blight upon trees, leaves, and fruit, and will destroy both leaves and fruit, and if not eradicated the tree also. In former bulletins we have noted its effect upon the fruit of the apple and pear in parts of the Willamette Valley. Later information develops the fact that in some portions of the State the pear trees are becoming badly infected, and unless promptly taken in hand and properly and thoroughly treated, will endanger the pear trees in these portions infected to little less than extermination.



These figures show the effect of the fungus on pear branches and leaf.

#### TREATMENT.

To find a remedy for these diseases has for a number of years seemed to baffle the most earnest efforts of those engaged in their discovery. All agree that cutting off the infected parts of the tree below the disease and burning the leaves as soon as they fall, are important means of removing a source of infection. Later experiments have revealed the fact that the spores of the fungus can be destroyed by the use of what is called the Bordeaux Mixture. To destroy the spores that may have survived the winter in the crevices of the bark, a strong solution of this wash should be used before the buds begin to swell, in the proportion of one half pound of sulphate of copper and one pound of lime to one gallon of water; but for summer use the following form of the mixture should be used, beginning at once and repeating the application every three or four weeks until the last of July or middle of August:

#### BORDEAUX MIXTURE.

Dissolve six pounds of sulphate of copper in sixteen gallons of water; in another vessel slake six pounds of lime in six gallons of water. When the latter mixture has cooled pour it slowly into the copper solution, care being taken to mix the fluids by constant stirring.



This wash is effective in destroying the black spot or fungi that is found upon many of the apples and pears grown in the Willamette Valley, and may be combined for convenience and saving of labor with the wash used for the destruction of the Codlin Moth, by simply using at the rate of one pound of London purple or Paris green to 200 gallons of Bordeaux Mixture.

#### CODLIN MOTH.

The description of this enemy of the apple, pear, and quince, has been fully given in previous bulletins issued by this Board, and doubtless his personal acquaintance has been made by every orchardist in the State who grows any of the above fruits, so that no extended description of this beautiful but pestiferous insect, and the mischief that he works in the "Big Red Apple"—the pride of Oregon—need be given here.

#### REMEDIES.

The results that have attended the use of the spray washes during the past two years have demonstrated beyond question that the apple crop can be saved, if the arsenical mixtures, either London purple or Paris green, are used, one pound to two hundred gallons of water, in the proper manner and at the proper time. Owing to the continued rains late into June last season the Codlin Moth did but little damage to early apples, and led many to think that they would not appear in sufficient numbers to do any material damage to fruits, and so neglected to spray; later developments showed that in this they had made a mistake. In continued thorough work, in the use of the spray pump, is the success of the orchardist to be found. At the quarterly meeting of the State Horticultural Society, held at Dallas in October last, Mr. D. O. Quick, of Suver, Polk County, read a paper on his success in spraying, in which he stated that he sprayed a six-acre orchard of twenty-year-old apple trees, six times, at a total cost of \$21, including the cost of material and the labor applying it. The first spraying was done on the 20th of May, the second on the 29th of May, the third on the 15th of June, the fourth on the 30th of June, the fifth on the 15th of July, and the sixth on the 25th of July, and he saved 90% of the fruit free from worms. The material used was one pound of whale-oil soap and one sixth pound Paris green to the barrel of water. He considered the addition of the whale-oil soap a valuable acquisition to the wash, as it worked better through the pump and spray nozzle. We think that Mr. Quick would have had even better results had he sprayed his trees once

more at least the latter part of August. It has also been found that the presence of hogs in the orchard, to eat the apples that fall to the ground, is beneficial in reducing the number of worms. Many of the worms can also be caught after they have escaped from the apple during the summer, by wrapping a piece of an old sack about the body of the tree, and removing it once in six days and killing the worms that have sought a refuge under its folds, by scalding, and again replacing it; this can be easily fastened by means of a string or tack.

In orchards where the fruit is effected with the black spot or fungus, the use of the Bordeaux Mixture, as given on page 5 of this bulletin, is recommended, in connection with the London purple or Paris green, as the lime in the Bordeaux Mixture will change the soluble arsenic compounds in the London purple and Paris green, which causes the burning of the foliage, into insoluble arsenite of lime, which will not injure the foliage, and it in no way diminishes the effect of the poison in killing the worm; a remedy is also at the same time applied that will prevent the black spot or fungus on the apple or pear.

#### BORERS.

There are a number of species of the Borers that work destruction to fruit trees, especially the apple and peach, a full description of which has been given in previous bulletins issued by this Board.

Care should be taken in planting a young orchard that the southwest side of the tree is protected from the hot rays of the sun, as it is found that trees thus injured are more liable to be infected with the Borers and at the point where injured.

#### REMEDIES.

Several remedies have been proposed to meet this evil. There is no question but that in this case, at least, an ounce of preventive is of more value than several pounds of cure. All fruit trees liable to be troubled with Borers of any kind should be examined at least twice each year, and the earth removed from about the base of the tree; and wherever the castings of the larvæ are found protruding through the bark, an application of unadulterated kerosene oil should be made by means of a small can. The sawdust-like castings absorb the kerosene, and it permeates the burrow and soon comes in contact with the larvæ, which ends his destructive work. The small amount of kerosene needed will in no way endanger the health of the tree, and does away with the old process of digging them out with a knife, which usually badly mutilates the tree; and it is also a great saving of time and labor, as a person can inspect and treat many trees in an hour. Hot water is also very effectual in killing

those about the base of the tree. It should be used boiling-hot, and after the earth has been removed from about the tree.

#### PREVENTIVE MEASURES.

The Moth may be prevented from laying her eggs upon the base of the tree, by placing stiff paper about one foot high around it, the bottom extending some two inches below the surface, and fastening the top with a string or wire.

The following wash, if applied hot to the trunk and large limbs of the tree the first of May and again the latter part of June, will not only keep the tree free from Borers, but also from any other insects that infest these parts of the tree, viz: One pound of potash and one pound of lard dissolved in five gallons of boiling water, stirring in one pint of crude carbolic acid; slake four pounds of lime in one gallon of water, and while hot mix all together, adding four gallons of water.

#### CURRANT AND GOOSEBERRY WORMS.

There are two kinds of these that are doing considerable damage to these fruits in some portions of the State. The imported Currant-Worm operates upon the leaves only; the Currant-Fly or Worm operates on the fruit.

#### REMEDY.

One large tablespoonful of powdered white hellebore dissolved in a pailful of water, and thoroughly applied by means of a syringe or watering pot, will eradicate both of the above pests. To prevent the work of the one that infests the fruit, the bushes should be sprayed just before the bloom and again soon after the fruit sets.

#### CAUTION.

In the use of whale-oil soap, in compounding any of the washes recommended by this Board, it is necessary that the soap shall not be less than 80 per cent in strength. All familiar with the making of soap know that the cost of the soap depends very largely upon the amount of water used; in other words, soap that costs six cents per pound to make can be reduced to three cents per pound, simply by adding water. But it will be seen at once that it will take two pounds of the latter to get the same results as from one pound of the former. To test the soap take five ounces and cut in thin slices; place these on a tin plate and thoroughly dry; if the soap is standard strength but one ounce will be lost in the drying. In buying avoid the cheap brands, for in using them the money invested, together with the labor, is thrown away.

INFORMATION.

If anything is found in your orchard that you do not understand, communicate with the Commissioner of your district, who is the Inspector, or proper person to advise with.

With this bulletin I also sent out the following blank:

The State Board of Horticulture desires to secure for publication in the Second Biennial Report of the Board, the information contained in the following questions. Will you, therefore, fill out the blanks below and return this sheet to me at your earliest convenience, and greatly oblige.

Truly yours,

ETHAN W. ALLEN,  
Secretary.

No. 76 Stark Street, Portland, Oregon.

How many acres have you planted to fruits of all kinds? -----  
How many apple trees? ----- How many pear trees?  
----- How many prune trees? ----- How many  
peach trees? ----- How many plum trees? -----  
How many cherry trees? ----- How many other than  
named? ----- How many acres strawberries? -----  
How many acres raspberries? ----- How many acres black-  
berries? ----- How many acres gooseberries? -----  
Remarks: -----  
-----  
-----

Name, -----  
Postoffice, -----  
County, -----

Write below the names of all in your vicinity who grow fruit, as we want the names of all such who live in Oregon.

While 5,000 of these were printed and sent out to the fruit-growers in all parts of the State, there has been but 210 of them returned to me filled out. These, of course, cannot enable me to give but a peep into the work that has been done in orchard planting; and all of those who received one of these blanks and did not take the necessary time to fill it out and drop it into the postoffice, and who shall perchance read this report, will, I trust, realize how much they could have added to the figures given by a few moments of time devoted

to this interesting feature of our work. The 210 persons reported as having 3,710 acres planted to fruit, and as having 105,202 apple trees, 47,890 pear, 215,695 prune, 56,503 peach, 4,200 plum, 9,804 cherry, 62,072 grape vines, and 5,099 trees not named in the blank, but among them were named apricots, almonds, figs, persimmons, nectarines, filberts, English walnuts, etc. These figures are valuable only as furnishing a basis upon which to make calculations to determine what is the probable status of our orchard interests. The above figures show that the average acreage of those reporting to be seventeen and three sevenths acres of orchard to each person. If this average should hold good for all to whom I sent the blanks, (and none were sent to any person not having been reported to me as the owner of an orchard), then the total number of acres planted to orchard by those whose names are enrolled upon our books as engaged in fruit-growing would be 87,145 acres; and presuming we have not been able to secure the names of more than five sixths of those who are engaged in the business, and that these be added to the above, then we should have a total of 104,574 acres already planted to fruit in the State. These figures also present some interesting facts for the guidance of those engaged in planting new orchards.

It is, I think, fair to presume—and in fact many of the reports made would so indicate—that the large proportion of the apple, pear, and cherry trees reported are old trees, and that the new plantings are largely of prune and peach. The above figures show that out of a total of 444,393 trees nearly one half are prunes; less than one quarter apple; little less than one tenth pear, and but one tree in forty-seven is that magnificent fruit, the cherry, which so delights itself in our Oregon climate. I would not say anything that would in any way detract from the great merit possessed by the prune as a fruit to be grown here in this Oregon of ours, but I do think that the full merit of the apple, the pear, and the cherry is likely to be overlooked by those who are engaged in orchard planting.

In connection with the statistics that I have been able to secure through the medium of the blanks sent out, and the deductions that I have made therefrom, I desire to embody the following figures, furnished me from the Census Department at Washington, D. C., through the kindness of Mr. J. H. Hyde, taken from the 1890 census. Those pertaining to the nurseries are as follows: There are 36 nurseries in the State, containing 1,576 acres, and with capital invested to the amount of \$236,658, and who employ 146 men and two women. These 36 nurseries contain the following trees, vines, bushes, and plants:

Apple.....	2,433,440
Apricot.....	225,000
Cherry.....	414,120
Nectarine.....	60,000
Peach.....	512,016
Pear.....	480,220
Plum.....	1,104,000
Prune.....	2,088,000
Quince.....	77,000
Nut.....	100,000
Deciduous (other than above).....	190,000
Evergreens.....	200,000
Grape vines.....	300,000
Strawberry plants.....	225,000
Raspberry bushes.....	100,000
Blackberry bushes.....	75,000
Currant bushes.....	100,000
Gooseberry bushes.....	60,000
Total number.....	8,763,796

The only comment that I feel like making to the above array of figures is in view of the fact that there has been but 4,200 plum trees reported in 210 orchards already planted. In the same ratio, how many will have to be planted to take care of the 1,104,000 plum trees found in the nurseries? Doubtless before this the larger proportion of them have been grafted over into the prune; for while Oregon can produce the plum in all of its beauty and glory, with no *Curculio* to interfere with its prosperity, still the demand for them is so limited that it has not been found a paying fruit to grow, except in limited quantities.

The work of the Board since the meeting at Grants Pass, in April, and that of your Secretary has been one of individual effort, of each in his respective field, limited only by the small amount of the appropriation placed at the disposal of the Board for the prosecution of the work delegated to them. The harvest of work has truly been plenteous. The cold continuous rains during the last of April and the first of May, in my opinion, prevented the fruit blossoms from properly fructifying, the results of which was that most of the blooms, not becoming fertilized, dropped from the tree. Therefore, Oregon has come the nearest to a failure in the fruit crop that has ever been experienced here during a period of forty years. This shortage in the fruit crop has seemed to engender carelessness and indifference in the average orchardist, the result of which has been great difficulty in keeping the work of clearing and caring for the

orchard up to the proper standard. I have spent much time in inspecting the fruit placed in the Portland markets for sale, and found in the early part of the season that a goodly part of that shipped from California was infected with the San José Scale. All such was immediately condemned, and either shipped back or destroyed. I found that the commission merchants and others that were handling fruit disposed to not only make no inspection of the fruit to ascertain whether it was infected with injurious pests, but also to pay no attention to them when plainly visible upon the fruit unless it was examined and condemned, they putting that construction upon the law. I therefore issued the following circular, and sent a copy to every merchant handling fruit in Portland and the neighboring towns.

### THE CIRCULAR.

STATE BOARD OF HORTICULTURE, }  
 272½ STARK STREET, }  
 PORTLAND, OREGON, August 3, 1892. }

It is very evident that the larger proportion of the fruit that is being shipped to this market from California is infected with the San José Scale. This scale is very dangerous to the fruit interests of the State, and the sale of fruit thus infected is prohibited by law. This Board has not sufficient funds at its disposal to keep a person employed to make an examination of all the fruits shipped to this market from California, nor is it the duty of the Board so to do. The aim and desire of the Board has been to secure the coöperation of every firm that handles these fruits, in seeing that the law pertaining to this was enforced, and to this end have sought to assist the dealers in making such examinations as would make them familiar with these and other insect pests. The Board now feels that you should be, and doubtless are, as well qualified to detect the presence of these pests as would be any person that could be secured to make the examination, had they the funds with which to employ such a person.

This, therefore, is to officially notify you that in the future the work of the Board will be to prosecute those found disposing of such infected fruits. The law makes it the duty of every person to ascertain that fruit is free from insect pests before offering it for sale. This knowledge the law will hold you responsible for.

It is the sincere hope of every member of the Board that no person or firm in the State will be found violating this law, which is so vital to the future fruit interests of the State. The penalty prescribed by law for selling fruit infected with insects injurious to

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fruit or tree, is a fine of not less than twenty-five dollars or more than one hundred dollars.

Please take due notice and govern yourself accordingly.

Respectfully yours,

E. W. ALLEN,  
Secretary.

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This had a very salutary effect upon the trade, and since the sending of it out, the Portland market at least has been comparatively free from fruit infected with insect pests.

It is, I think, very noticeable that a change for the better is prevailing among those who are in any way connected with the fruit interests of our State. The feeling certainly predominates that the work of this Board must be prosecuted, and that a larger sum of money should be placed at their disposal. The work accomplished by the State Horticultural Society has been of great assistance to the Board, and has also done good in imparting most valuable information in the many papers carefully prepared, read, and discussed at the meetings of the Society. I deem it a part of the duties incumbent upon this Board to do all that it can to foster and aid this Society in the work that it is organized to accomplish. We are certainly deeply indebted to it for the many valuable papers that we are enabled to present with this report of the Board. I cannot but feel that it is due to those that shall come after us that we shall chronicle, so far as we may be able, the many interesting features that cluster around the large history of horticulture in Oregon. Hence I deem it not out of place to incorporate into this report some of them that have come to my knowledge since the last report was written.

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## A REVIEW OF THE FRUIT INDUSTRY.

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Looking back over the past history of Oregon, we find few more interesting and prolific themes than that of "Horticulture." Its very earliest beginnings have their origin in a romantic episode, which but for its authentic character, would savor of the improbable. Long years before the earliest American emigrants made up their minds to cross the Rockies and possess this fair land, while yet the Hudson Bay Company were to all intents and purposes the lords paramount of the splendid realm "where rolls the Oregon," a dinner party was given in London, England, at which Captain Simpson of



the Coast Survey Service, being about to depart for the North Pacific Coast, was the guest of honor. Apples formed a part of the dessert, and probably in a spirit of bandinage one of the ladies present took the seeds from an apple that she was eating and dropped them into the pocket of Captain Simpson's waistcoat, with the admonition that when he reached this Northwest wilderness he should plant them. The incident had entirely escaped the mind of the Captain until about a year after its occurrence. He was invited to attend another dinner party given in his honor, but in the menu of which appeared no apples, for apples had not as yet become a product to be found in the markets of Fort Vancouver, at which place he was now the honored guest. While dining, the Captain found in the pocket of the waistcoat he had last worn in London, the apple seeds playfully put there by his lady friend. Taking them out he gave them to the gardner, who carefully planted them, and from them grew two trees, which were doubtless the first apple trees grown upon the Pacific Coast. During the succeeding twenty years following the planting of the apple seeds so romantically sent from London, Oregon in its isolation was the scene of many strange makeshifts and experiments in the domain of horticulture.

The advent of the Lewelling nursery in 1847 filled a want created by the traditional fruit hunger said to be so deeply seated in the stomachs of the Aryan race; and within a few years after the occasion of this most important event in Oregon's history, the products of the orchards began to play a very considerable part in the commerce of the country, and until 1860 the business of fruit-growing was very profitable, and a number of snug fortunes were accumulated thereby.

The decline of the industry dates from the time when California began to produce fruit sufficient to supply her home consumption. From that time until within the past ten years there were no markets accessible for our fruits, and there was but little if any care taken of the average orchard, the farmers having turned their attention to the growing of grain, which has become the staple product of the State, and has continued thus so long that it is next to impossible to make the farmer realize that the valleys of Oregon at least are garden spots, and should be cultivated as such, and not as a farm. Rich as have been the returns from these lands when used to produce a crop of grain or hay, yet these are trifles when compared to the munificent returns they give when planted to fruit. Since the advent of the railroads that give us access to the markets of the East, this fact is becoming so evident that many are beginning to realize the truth of it, and the grain and pasture lands are

fast being planted into orchards. There is no question but what fruit-growing is well calculated to make full use of all the advantages here found in soil and climate. It is an industry that will add immensely to the wealth of the people, and it will transform the entire country into a garden of beauty.

The large land-holdings have retarded and will for a time keep back the full development of the country, but this condition of things is rapidly passing away, and the large holdings are rapidly being subdivided into smaller tracts, so that the laboring man is thus enabled to secure for himself a home. The probabilities are that within a few years the acreage of orchard lands will extend over a large proportion of the valley lands of not only Western but Eastern Oregon as well; and the traveler in passing through the State by rail will behold on either hand, from mountain slope to mountain slope, one vast expanse of orchard in glorious fruitage that will be a bonanza to the fortunate owners and which will add immensely to the material prosperity of the State. It is a wealth of which all may partake; and he who owns a few acres of good fruit land in Oregon has an assured competency for life, and is one of the most independent men to be found in any calling. While the natural conditions are all that can be desired for fruit-growing in Oregon, the fact still remains that here, as elsewhere, the best results cannot be attained except by complying with the same principles that are requisite for successful fruit-growing in other and less favored localities. That these essential requisites have been largely ignored by the average fruit-grower in Oregon in the past will account for the present condition of many of our orchards, which are not producing the fruit that they should or would under proper care, but are simply illustrations of what the soil and climate will do here in this favored locality, despite the utter disregard of all the true principles of fruit culture.

It can be truly said, however, that we are on the eve of a great revival in fruit-growing, and not only are large orchards being planted, but more attention is paid to the selection of those kinds and varieties that will yield the best results from a commercial standpoint. Thus it is that large prune, apple, pear, peach and cherry orchards of most carefully selected varieties are being planted in all parts of the State. While the principal fruits grown for the markets will be prunes, apples, pears, peaches, and cherries, other fruits will be grown in great abundance, and in such quantities as will supply not only the home demand but such other demands as may be made for them. It can therefore be truthfully claimed that Oregon offers to the fruit-grower a wider range of latitude in fruits that can be successfully grown than any other

State in the Union, and, we think, than any other country in the world.

#### PRUNE GROWING.

As prune-growing is rapidly coming to the front as one of the largest and most profitable industries in the State, I have deemed it advisable to give in brief a few suggestions relative to its history and growth, as scarcely a day passes that some person does not call at the office of the Board to secure some information relative to it.

The name prune is derived from the Latin *prunus*—a plum; and in its generally accepted designation is applied to those special varieties of the plum family that possess exceptional curing qualities of firm texture, easily dried whole, in the sun or artificially, without fermenting at the pit. These varieties constitute the prune of commerce, and its history dates back to the time of Pliny, who speaks of its culture by the Romans. That part of the earth's surface where the prune can be grown in all of its perfection is comparatively very small, and in no other place can all the varieties be grown to such perfection as they can in Oregon.

France, Germany, and Italy are the great prune-producing countries of Europe, and yet in none of these can all of the varieties be grown equally well. The French, the German, and the Italian prune are each adapted to the country from which they take their name; but in Oregon they all do equally well, and each variety attains its highest stage of perfection. Oregon had no trouble in taking the sweepstake premiums on the above varieties when placed in competition with prunes grown in these European countries, at the Centennial Exposition in Philadelphia in 1876, and again at the Cotton Centennial Exposition, at New Orleans, 1884-5. There is no fruit in the world so easily produced and so readily prepared for the market, and with so large a percentage of a certainty of a crop, and so remunerative to the grower, as is the prune when planted in a soil and surrounded by a climate suited for it. Thus it is that in Oregon is found that combination of soil and climate in which the prune especially delights, and in which it reaches its highest state of perfection.

The prune is a fruit peculiarly sensitive to both soil and climate. It is a large feeder, and reaches its best in a rich and heavy soil with a good underdrainage, but with a sufficient moisture to feed it. The prime requisites in the prune are a solid, firm flesh that will not ferment at the pit in drying; a rich, fruity flavor and bouquet, and a keeping quality that will stand the tests of months or years without serious loss from shrinkage; and those sections which possess the peculiarities of soil and climate which insure these in

the greatest perfection are the true and only places where the prune can be grown with good success. The drying qualities of the prune are also greatly varied, owing to the varieties of soil in which it is grown. In some localities it will shrink in drying from four to one, while in others two and one half pounds of green fruit will make one pound of evaporated.

If the climate is too hot when the prune begins to ripen, it shrivels up and becomes leathery; if too cold, the fruit does not acquire the saccharine juices that are so essential to its flavors. This is peculiarly true of the best variety grown, the Italian, which is without question the *par excellence* of all prunes grown. Thus it will be seen that when the comparison is made between the soil and climate of Oregon, as it is, and that required to produce the prune in all of its perfection, here is found the natural home of the prune; and while other less favored sections of the world will continue to produce the prune in a limited extent, still the time will soon come when the consumer will look to Oregon for that prune which will outrival all others in all of the essential qualities of the most perfect fruit. The fact that the climate and soil of Oregon are so well adapted to the growth of the prune is but little known even among her own people. A number of our more enterprising horticulturists have, however, succeeded during the past few years in demonstrating this fact, and the pulse of horticulture has been very much quickened thereby.

It is not within the province of my report to enter into the detail of the production and preparation of prunes ready for the market, for this information will be found in other articles printed in the back of this report; and yet it may be of value to the reader of this report, who may desire to engage in the business of prune-growing, to give a few figures relative to the cost of planting and cultivating an orchard until it comes into a bearing or paying condition. The cost of the trees, 108, set twenty feet apart, together with the plowing, planting, and the necessary cultivation for the period of three years, in an orchard of not less than twenty acres, will be not far from fifty dollars per acre, providing the land is in thorough cultivation to begin with. The trees will usually commence to bear the third year and reach their full bearing about the seventh. One hundred and fifty pounds of green fruit to the tree is a low estimate of an average yield, and  $1\frac{1}{2}$  cents per pound a low price for the green fruit. The gross amount received from one acre of prunes at this rate sold green would be \$243, and the \$43 will easily pay the annual expense per acre.

By evaporating the prunes these profits can be still further increased, three pounds of the green fruit making one of the evap-

orated. That these figures are low is evidenced from the fact that many times this amount has been realized per acre from the crop of prunes produced.

Is it to be wondered at that prune orchards in full bearing are valued at one thousand dollars per acre?

#### THE APPLE.

After having said so much about the growing of prunes, it perhaps may be well to say a few words at least about some of the other fruits that are so well adapted to Oregon's soil and climate. We have already seen that in the very beginning of her history, while yet she was as it were in her swaddling clothes, that she justly earned for herself the sobriquet of "The Land of the Big Red Apples;" and it stands as a recorded fact that her apple crop did in her early history play a most important part in her financial prosperity.

The apple is regarded by all as the king of fruits, and it is therefore wise that those who are now engaged in orchard planting, in Oregon at least, should not forget these great facts, and remember that no fruit equals it in wholesome, nutritious matter; and many there be that claim that it has within itself more brain-producing food than has any other fruit or vegetable. Be this as it may, there can be no question but that there will always be a ready demand for all of the best grades of winter apples; therefore, we say, do not forget the Big Red Apple in your planting.

The enemies of the apple, both tree and fruit, are foes worthy of the steel of the best orchardist; and yet if the battle is begun from the very first sprouting of the seed, and care is taken that the Woolly Aphis is not allowed to secure a foothold upon the nursery stock, either on branch or root, the battle is comparatively an easy one. The hard fighting comes on after the enemies of the tree and fruit are allowed to become thoroughly entrenched upon the tree, both root and branch.

#### THE PEAR.

If the apple is termed the king of fruits, to the pear belongs the title that has been so justly ascribed it, "The Prince of Fruits." The pear is undoubtedly the favorite dessert fruit, and the delicious varieties of the present day leave little to be desired as a fruit to be eaten out of the hand.

Although Belgium has been termed "the Eden of the Pear," yet neither there nor elsewhere has a pear been produced that equals some of our American seedlings, notably the Seckel and others. The pear, like the prune, does not flourish and do equally well in all

countries and climes; but like the prune, it arrives at its highest stage of perfection, both as to size and quality, in this Oregon of ours. With proper care in the selection of varieties, and the proper location in which to plant them, a magnificent revenue can be realized from the pear orchard; and this fact, I may again say, should not be overlooked by those planting orchards. The greatest drawback to extended pear culture is the disease familiarly known as Blight. The predisposing cause of this malady has not been specifically determined. The active cause of dissolution is known to be parasitical fungi. This much, however, experience seems to confirm, that trees placed in positions and under circumstances of soil and climate that insure a growth of moderate vigor, which growth shall become perfectly matured and solidified before the advent of winter, are so seldom attacked by this disease as to be for all practical purposes exempt. The other enemies of the pear tree and its fruit are such as can be easily mastered by the free use of the spray-pump and the proper mixtures.

This report might be extended to great length by presenting the claims of each and all the fruits that are knocking at the door of our orchards for admission, and with great promise of magnificent results; but I will forbear, as I feel that I have already exceeded the space that should be accorded me within the pages of the report of your most honorable body.

Before closing, however, I desire to return special acknowledgments to Prof. C. V. Riley and his assistants for the many favors secured from the Division of Entomology, U. S. Department of Agriculture at Washington, D. C.; to Secretary B. M. Lelong of the California State Board of Horticulture, for copies of their most valuable reports; to Alexander Crow, Quarantine Officer of the same Board, for his hearty coöperation in the work of his department; to the Secretaries of the Maine, Massachusetts, Michigan, Illinois, Minnesota, Missouri, and British Columbia Horticultural Societies, for copies of their valuable reports. It has been the aim of your Secretary to keep at the office of the Board a complete file of many of the leading horticultural papers of the country, in addition to a copy of the reports of other societies and boards, and such other books as would be of value to the work of the Board. In this I have been aided by the proprietors of the *Rural Northwest* and *The Northwest Pacific Farmer*, not only by placing free a copy of their papers for our files, but also by aiding in every way possible the work of the Board, by publishing the Bulletins and all other items of interest connected with the work in their valuable papers. The uniform courtesy that has been accorded to this Board in its arduous and important work by the press of the State is significant

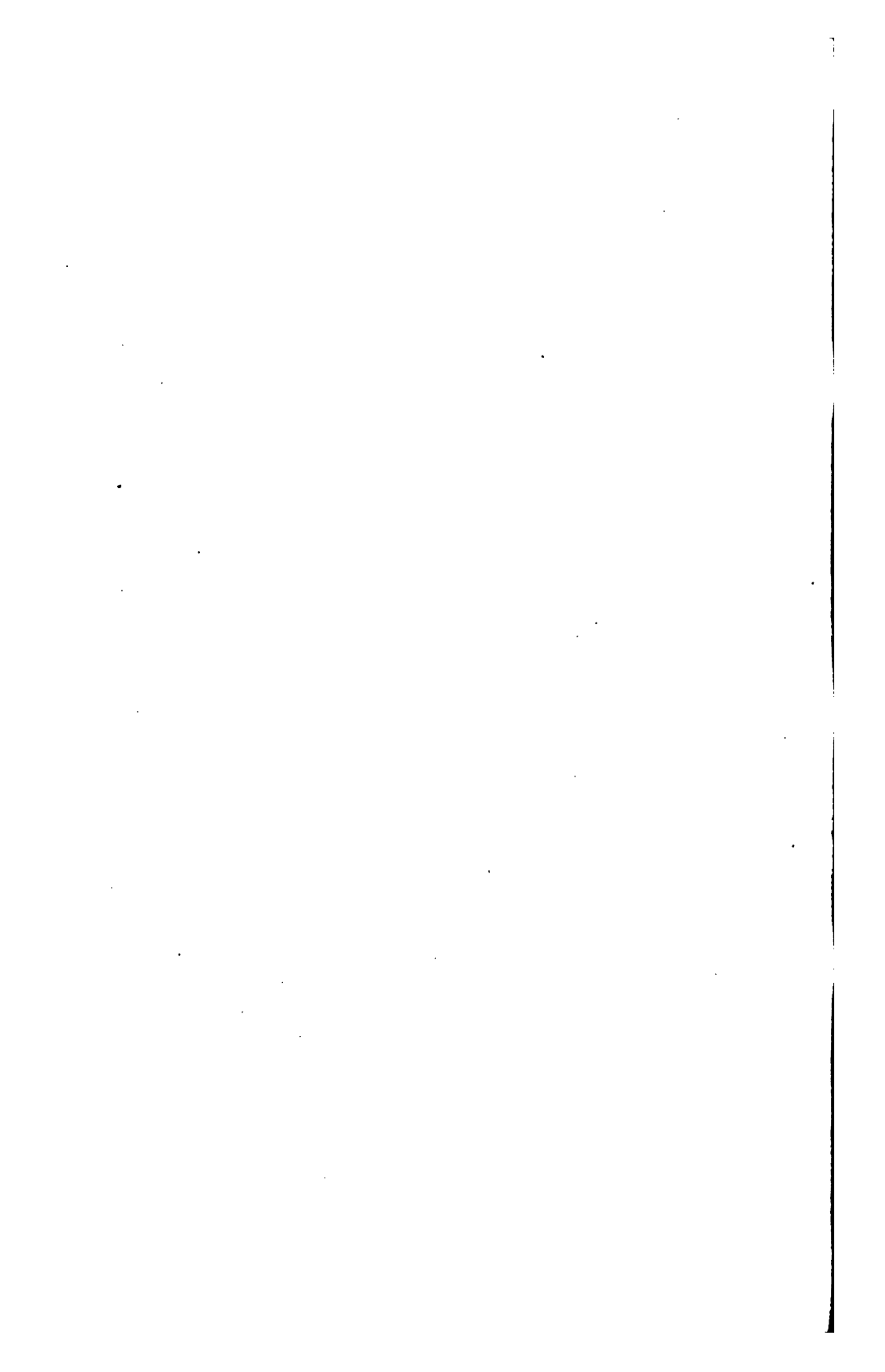
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of the hearty interest that they have in doing all that they can to build up and foster this great industry. They have not dealt with us in the spirit of criticism; but in that spirit that sees the good, and not the errors in the labor of our hands.

To the press of the State, to each individual member of the Board, I extend my hearty thanks for the uniform courtesy that I have received at all times in the discharge of my duty as your obedient servant.

Respectfully submitted,

E. W. ALLEN,  
Secretary.





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APPENDIX  
CONTAINING ARTICLES

WRITTEN BY MEMBERS OF THE

Oregon State Horticultural Society

1891, 1892.

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ALSO

*CONSTITUTION AND BY-LAWS OF THE SOCIETY.*

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OFFICERS:

J. R. CARDWELL, President.

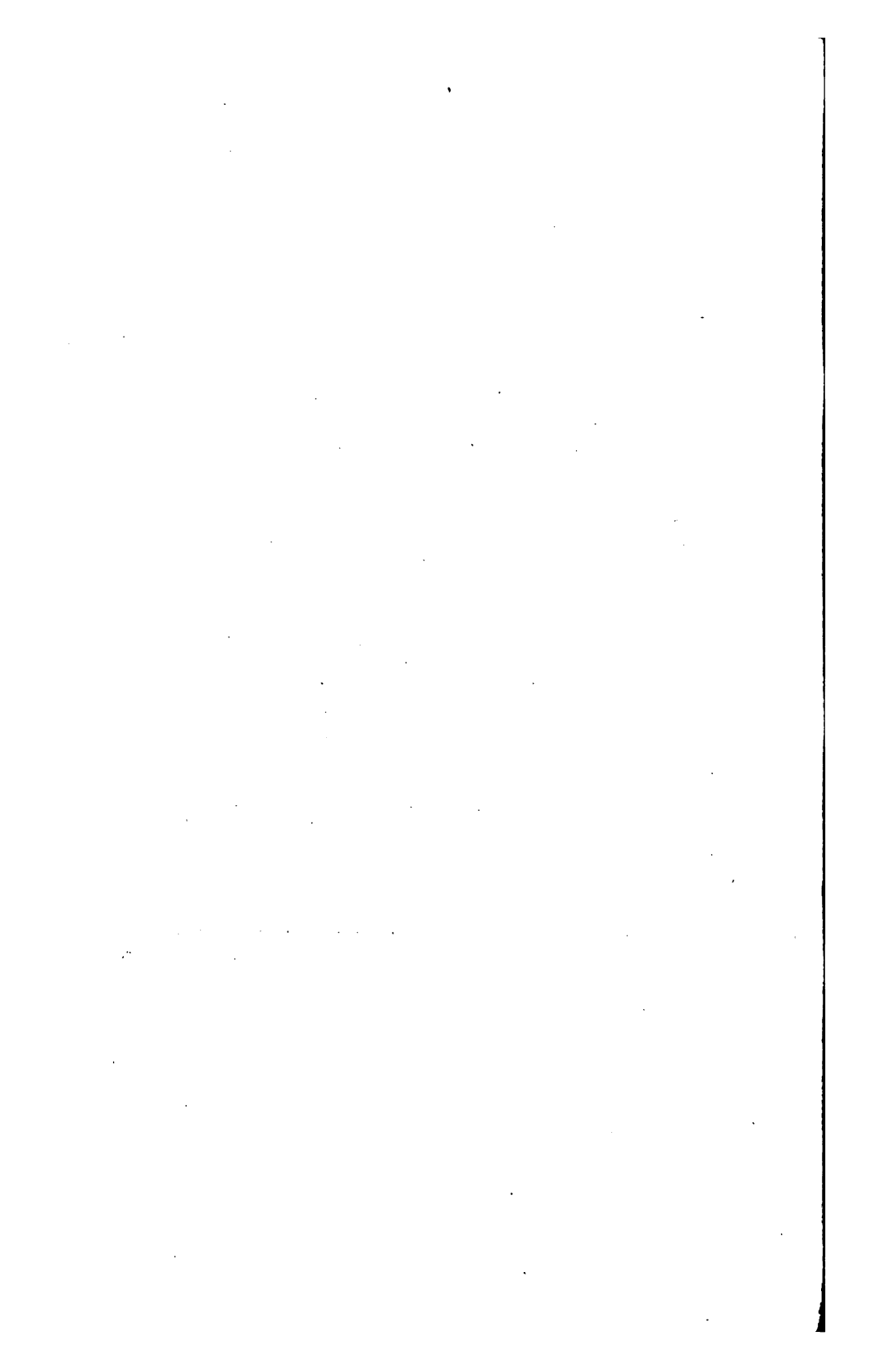
A. H. CARSON, 2d Vice-President.

O. P. S. PLUMMER, 1st Vice-President.

G. I. SARGENT, Secretary and Treasurer.

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# CONSTITUTION.

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## ARTICLE I.

### NAME.

This organization shall be known as the OREGON STATE HORTICULTURAL SOCIETY.

## ARTICLE II.

### OBJECT.

The object of this Society shall be the dissemination of knowledge of the science and art of horticulture among its members, and the development and advancement of all interests pertaining thereto.

## ARTICLE III.

### MEMBERSHIP.

Section 1. The membership of this Society shall consist of annual, life, and honorary members.

Section 2. Any person may become an annual or life member by the payment of the required fees.

Section 3. Any person having done the Society, or horticulture in general, special valuable services, may become, by a two thirds vote of the members present at any regular meeting, an honorary member.

## ARTICLE IV.

### FEEES.

Section 1. The fee for annual membership shall be one dollar for men and fifty cents for women, payable at the annual meeting.

Section 2. The fee for life membership shall be ten dollars, payable at one time, or fifteen dollars payable in three equal installments.

## ARTICLE V.

## OFFICERS.

The officers of this Society shall consist of a President, First and Second Vice-Presidents, Secretary, Treasurer, and a Finance Committee, consisting of the Vice-Presidents and a third member, all of whom shall be elected by ballot at the annual meeting, and shall hold their offices for one year, or until their successors are duly elected and qualified.

## ARTICLE VI.

## DUTIES OF OFFICERS.

The officers of this Society shall perform the duties usually devolving upon such officers in similar organizations; *provided*, the Finance Committee shall audit all bills and accounts of the Society, and make an annual statement of the Society's finances.

## ARTICLE VII.

## MEETINGS.

The Society shall hold four regular meetings each year—the annual meeting on the second Tuesday of January; the others on the second Tuesday of April, July, and October, respectively—and such special meetings as the Society may, by a majority vote at any regular meeting, determine; *provided*, the finance committee are authorized to call special meetings in the interim of the regular meetings on petition of eleven members.

## ARTICLE VIII.

## AMENDMENTS.

The by-laws shall be equally binding with the constitution; and alterations or amendments to either may be made at any regular meeting by a two thirds vote of the members present; *provided*, notice of such proposed amendment or alteration has been given at least fifteen days preceding the meeting.

## BY-LAWS.

### ARTICLE I.

#### THE PRESIDENT.

The President shall be the executive officer of the Society. It shall be his duty to see that all general rules and regulations of the Society are enforced; to preside at all meetings; to appoint all standing and special committees not otherwise provided for; to prepare and deliver an annual address, and from time to time present in outline the work and new issues before the Society.

### ARTICLE II.

#### VICE-PRESIDENTS.

The Vice-Presidents shall, in the absence of the President, preside by seniority and perform all the duties appertaining in that office. They shall also act in conjunction with a third member as the Finance Committee, whose duties are defined in the Constitution.

### ARTICLE III.

#### SECRETARY-TREASURER.

The Secretary-Treasurer shall be the recording, corresponding, and reporting officer of the Society. He shall, with the advice of the President, arrange all programmes for meetings; edit all reports, unless otherwise provided; give all official notices for publication; issue all calls for meetings; collect and record all membership fees and other dues; pay all bills of the Society; *provided*, no bill is paid until approved by the Finance Committee and so ordered by the Society; have the custody of all books, papers, moneys, and seals belonging to the Society. He shall keep his accounts in such a manner that the funds of the Society may be ascertained at any time; and at the regular meetings in January and July of each year shall present to the Society an accurate statement of all moneys received and disbursed by him.

## ARTICLE IV.

## STANDING COMMITTEES.

Section 1. The following standing committees, to consist of three each, shall be appointed as soon after each annual meeting as may be: Orchard Fruits; Small Fruits; Vegetables; Flowers; Ornaments; Entomology; Botany; Nomenclature; New Fruits; Legislation; Exhibits.

Section 2. Each committee shall present a full written report of its proceedings, with recommendations to the Society.

## ARTICLE V.

## PLACE OF MEETING.

The annual meeting shall be held in the city of Portland; all other meetings shall be held at such places as the Society, by vote at a previous meeting, may direct.

## ARTICLE VI.

## AUXILIARY SOCIETIES.

Section 1. Local and county horticultural or pomological societies may, by the annual payment of three dollars and the election of three delegates to the meetings of this Society, become auxiliary to this Society; *provided*, at least one delegate shall be present at each regular meeting.

Section 2. Such auxiliary societies shall be entitled to five copies of all official reports, etc.; *provided*, the secretaries of such societies shall present at the annual meeting of this Society a full written report of all the work done by their respective societies for the year.

## ARTICLE VII.

## REPORTS AND PUBLICATIONS.

Section 1. Every member in good standing shall be entitled to one copy of all official reports and publications without compensation.

Section 2. The President and Secretary shall be authorized to exchange publications with such other organizations as they may deem desirable.

Section 3. The Secretary shall be authorized to present, for

review and notice, a limited number of copies to the leading papers of the State and coast and national horticultural publications.

## ARTICLE VIII.

### QUORUM.

Section 1. Fifteen members shall constitute a quorum for the transaction of business; but a less number may meet, call to order, and adjourn from time to time.

### ORDER OF BUSINESS.

Section 2. 1. Call to order and reading of minutes of previous meeting; 2. Reports of officers; 3. Reports of standing committees; 4. Reports of special committees; 5. Papers, addresses, etc.; 6. Elections; 7. New business.

### RULES.

Section 3. The rules of parliamentary practice as laid down in Cushing's Manual shall be adopted as the rules governing this Society.

## ADDRESS OF THE PRESIDENT.

[Delivered before the State Horticultural Society, by the President, Dr. J. R. CARDWELL, at its annual meeting, January 12, 13, 1892.]

It is my pleasant duty to report to you our proceedings and reviews, as briefly as may be, for the seventh year of the Oregon State Horticultural Society. And if you will allow, it is with some pride as your Chairman and a horticulturist that I refer to the increase in our membership—now all over the State—and the fact that we are the largest body of horticulturists on the Pacific Coast. It is pleasant to recall the increased attendance and great interest taken in our meetings, the valuable papers presented, and the interesting and profitable discussions following.

You remember that it was with some misgivings as a local fruit-growers' association that we essayed to become a State horticultural organization, and to revise and broaden our constitution; to adopt the name and all the methods of a State horticultural society in the full meaning of the broad term "horticulture;" to form a society which would go out from home and hold quarterly meetings in different sections of the State and meet the fruit-grower, the nur-

seryman, the farmer, the gardener, and all the specialists—soil-workers—on their own grounds and at their homes; to ask for papers and exhibits of fruits and flowers, and all other products of the soil, and to stimulate a commendable rivalry, by offering premiums. It was the aim of the new organization to bring out the horticulturists and the people, and to make its meetings interesting and profitable, and to do any and all things a society may do to awaken an interest in the horticultural development of the State. In all this we have fairly succeeded; and as nothing succeeds like success, I can say to you, our future as a State organization is assured.

We have held three meetings, by invitation of their respective horticultural societies and citizens, at Salem, Newberg, and Dallas.

The April meeting at Salem, by invitation of the Marion County Horticultural Society, was held in the Senate Chamber of the State House. The leading fruit-growers of the section—one of the oldest and best orcharding sections of the State—were present, and enlivened the meeting with prompt and ready discussions of the papers and subjects brought forward. A carefully prepared paper on the strawberry, by Mr. E. Hofer, was a feature of the meeting. Mr. Hofer dwelt on the superior qualities, prolific bearing, and intrinsic value at home and in the market, and gave his own experience with this fruit, and made suggestions as to sorts to plant, cultivation, packing, and marketing. The paper was then discussed at length, and favorably commented upon. We were then highly entertained and instructed in a paper by Mr. F. J. Beatty on tile draining. Mr. Beatty is an earnest advocate of thorough tile draining, and his facts, figures, and experience were listened to with interest, and elicited an animated discussion, which told in favor of systematic tile draining—particularly on our nearly level lands with clay subsoils. The next paper, by S. A. Clarke, took a broad and comprehensive view of the fruit industry, in which the superiority of our fruits, particularly the prune, was set forth in strong terms—referring to packing, shipping and marketing, and the writer's experience as a fruit-grower. His remarks were listened to with marked interest; all of which brought out an extended discussion.

The July meeting, by invitation of the Newberg Horticultural Society, was held in the thriving town of Newberg, one of the most promising fruit districts of the State, and the center of a large prune-growing industry, and all other fruits of the valley as well. Here we were received with a cordial address of welcome by President E. C. Armstrong of the Society. A hall was tastefully decorated with flowers and fruits, and we were taken to their homes and most hospitably entertained by the citizens, and everything was done to make our stay pleasant and enjoyable. The meeting



was large, and a marked and most agreeable departure was the attendance and evident interest of the ladies.

Newberg is a well-to-do, prosperous, substantial village, with a solid backing of fruit-growers and farmers, and is destined to become an important distributing point for all our products. It has now one cannery, several driers, and ships considerable green fruit. The papers read at this meeting were full of interest, and were promptly and instructively discussed.

R. D. Allen, a successful fruit-grower of Silverton, and Secretary of the Marion County Horticultural Society, read a carefully prepared paper, replete with facts and practical suggestions on orchard cultivation, which was well received and discussed at length; all of which applies to a paper by E. H. Skinner, on "The Apple." Mr. Skinner is an orchardist of long and varied experience, and was listened to with interest, and opened a broad field of discussion, alike interesting and profitable.

A paper by M. Scheydecker, on "The Peach," was well received, and opened up an interesting discussion on this valuable fruit. Mr. Scheydecker is an advocate of deep and thorough preparation of the soil; a careful selection of thrifty growing trees of the sorts known to do well in the locality to be set, clean cultivation and trimming back a third or more of each year's growth and thinning fruit sufficiently to grow only the largest and finest peaches.

The fourth and last meeting of the year, by invitation of the Polk County Horticultural Society, was held in the beautiful village of Dallas, in Polk County, on the banks of the Rickreal. The Oregon State Board of Horticulture adjourned its semi-annual meeting in Portland, and attended this meeting in a body, took an active part in its proceedings, and added much to the interest, which met a most encouraging recognition. Dallas is surrounded by a rich, picturesque and prosperous fruit-growing and farming district, which, from the earliest times, has been the home of some of our best fruits. Here the local horticulturists were out in full force. Mayor Ellis received us with an address of welcome, in a commodious hall decorated with fruits and flowers and a fine exhibit of the local products, in which, as at Newberg, ladies had taken a leading part and graced by their presence. The attendance was large, and full of interest and profit. A feature of this meeting was the large attendance and active participation of the ladies; also very enjoyable vocal and instrumental music by the local talent. The hall was filled with an intelligent and interested audience. An eloquent address by Prof. T. E. Campbell, in which he reviewed the history of agriculture from Bible times to the present, with a fine eulogy on the dignity and mission of the tiller

of the soil, making some practical applications to Oregon and our favorable conditions for this honorable and profitable pursuit, was listened to with earnest attention.

Able, interesting, and practical papers were read — one by Mr. A. N. Dodd, on "Trimming;" D. O. Quick, on the "Apple and the Codlin Moth;" M. Scheydecker, on "Orchard Cultivation." Mr. T. L. Parker addressed the meeting on "What of the Future?"

These papers and addresses, the discussions thereon, the fine exhibits of fruits, green and dried, vegetables and flowers, music, attendance and participation of the ladies, and the hospitality of the citizens, made this one of the best meetings of the year.

Summing up the year, as before stated, are we not justified in claiming great prosperity and substantial advance as a State society? Our last fruit crop, though not a failure — which we may say we have never had in Oregon — has been much below the average, and the output abroad, though considerable and aggregating a large sum of money to the State, has on the whole, to individual fruit-growers and shippers, been unsatisfactory, for the reasons that other sections of our country and foreign countries have had abundant yields, and consequently prices have ruled low. Our dried products — prunes, apples, and pears — have been short. In late-keeping fall and winter shipping apples and pears, we may almost say we have nothing marketable, and that offered in the home market shames the reputation Oregon once acquired as "the land of big red apples." Alas! for the most neglected spot on the farm — the grass-sodded pasture, the untrimmed, moss-covered, lousy-aphis-ridden, moth-infected apple and pear orchard. It is small wonder that our apples and pears are inferior in size, scabby, wormy and unmerchantable, and, as often said by the "mossback," "there is nothing in fruit — apples don't pay in Oregon!"

To illustrate (?) this, we quote from a California journal: "Apples are absorbing a large share of attention in the East just at present, and there is a lively scramble for sound track goods before things freeze up for the winter. The supply of fall apples was large and fine, and this tended to divert attention from late-keeping winter stock. It now turns out that late-keepers are a short crop, and prices on the track are ranging from \$2.35 to \$2.85 per box, with a prospect of \$3 in the near future. The Michigan crop, which was very short, is nearly all harvested. The New York crop is fair, but is chiefly Greenings, Russets, Spys, and but few red varieties. The Missouri, Iowa, Nebraska, and Kansas crops are heavy. The orchard districts are thick with buyers, and lively times are promised in apple circles before the season is over." Good, sound, red apples today are worth one dollar per box in Portland, and will be

worth three dollars before the season is over. And still it "don't pay to raise fruit in Oregon!"

#### THE WAR ON INSECTS.

To the credit of our Society be it said, we have seen the shadow of this blight spreading over the land, and early raised a warning voice in 1886. The situation and impending calamity was earnestly and thoroughly discussed. A committee of five was appointed to draft a bill creating a State Horticultural Board, whose duty it should be to appoint an inspector of fruit pests, to visit infected orchards, point out the pests and their remedies, and otherwise to assist the orchardists to inaugurate a war of extermination; to publish and distribute bulletins of instructions and formulas for the preparation of insecticide sprays and washes, and their best methods of application, and to point out the individual interest and public necessity of the work.

Your committee did their work well, and prepared a bill which you approved, and submitted it to the Legislature of 1887. This bill, through some misconception, was opposed by the small orchardists and mossbacks, and was defeated; the bill was again taken in hand by your committee, and through the Multnomah delegation was presented to the Legislature of 1889, and after a defeat in the House, finally through the indefatigable labors of your committee and a few friends in the Legislature, was reconsidered and passed both Houses, and on the 25th of February received the signature of the Governor and became a law. With the individual members appointed and work of this Board, you are familiar. Its bulletins and first biennial report are before you. The delay in passing the law organizing the Board and getting an inspector in the field found the orchards of the State destructively infested with the Green Aphis, Woolly Aphis, Codlin Moth, and in some districts San José Scale Borers, and other pests. Extensive correspondence with the Government departments in Washington, experimental stations all over the country, the State Horticultural Board of California, and different State inspectors of insect pests, soon enabled the Board to formulate and publish its first ten thousand bulletins, containing descriptive cuts of our pests and the best known means for their extermination. Through the influence of the Board, dealers were induced to import spraying pumps and the Cyclone nozzle.

For be it known, up to this time there was not a good orchard spraying outfit in the Willamette Valley. The Board appointed a very competent inspector in the person of Commissioner J. A. Varney, who traveled continuously over the State, pointing out the pests and inaugurating the work of rescuing the orchards. To tell

the difficulties and experience the Inspector and the Board met with in dealing with the mossbacks and others, would be a long story,—sometimes amusing and sometimes otherwise,—still the work progressed. More spraying pumps were imported and sold. The leaven was working, and the educating process was going on slowly, it may be, but surely, and now the situation and remedy is beginning to dawn, even on the old mossback.

It has been discovered that this tree-renovating process and spraying with Paris green, London purple and other sprays can be done at trifling expense, and will pay a big return in saving 90% of good, merchantable fruit. It is a conservative estimate to say 95% on the labor and capital invested. This is now becoming apparent to all our fruit-growers, and whilst perhaps many of the old orchards are beyond reclaim, it is also evident that with brains and thorough business methods, there is no more promising or lucrative outlook for labor and capital than setting apples in Oregon; and enterprising young men and old men are going into this business to reap a golden harvest.

The young man, or woman for that matter, who will properly set ten acres in Gravenstein Apples, Red Cheek Pippins, or Ben Davis, or Bartlett Pears, Royal Ann Cherries, or Italian Prunes, or any one of them, and properly tend them for ten years, need not be a wage worker, and may breathe the free air and live in the sunshine of heaven and exult in the glorious privilege of being independent. This is the offered heritage to the wise and provident fruit-grower. Verily, this is heaven's first and highest calling.

The State Board of Horticulture, through its very efficient Secretary, Mr. E. W. Allen, has secured an area of six thousand square feet in the World's Fair Horticultural Building at Chicago, for the display of an Oregon horticultural exhibit. This exhibit will be of incalculable importance to the State of Oregon, and must be made, and will be made, but to what extent, and whether creditable or not, will depend largely, we believe, on this Society and the horticulturists of the State. I respectfully call your earnest attention to this matter, and would suggest some action at this meeting. The time for doing something is upon us. Everybody has had his say, and the Legislature and the management of other folks has, perhaps, been sufficiently criticised and abused. The fact is, as a State, we have fallen behind our neighbors and other States of the commonwealth, and now stand in a disgraceful position, shirking our duty and neglecting our privileges—we are unpatriotic and unprogressive. Shall this great and growing interest be properly represented and stand upon its merits before the world at this great World's Fair Exposition? Shall we not as individuals and a

Society do something to place Oregon where she rightly belongs, and show our faith by our works by subscribing liberally to a fund for this purpose? An attractive part of this exhibit can and should be made in glass. The season and last opportunity for putting up this exhibit is near at hand. Your committee needs the paltry sum of \$300 to send to Philadelphia for the necessary glass manufactured for this purpose. Our worthy member, Mr. E. W. Allen, Secretary of the State Board of Horticulture, who has had large experience at the World's fair at New Orleans and expositions in our city, and is known to have a superior method of processing fruits, would, doubtless, if requested, collect and put up our fruits ready for shipment, entirely from patriotic motives at minimum cost. Dried fruits can be looked after later in the season, and our green fruits as they come in the season of '93. Our worthy member, Mr. C. E. Hoskins of Newberg will be in Chicago, and if delegated, would take charge of an Oregon exhibit of fruits and talk it up entirely from patriotic motives. Of his earnestness and ability in this line I need not speak. Shall the work go on? Shall Oregon be represented? Shall we have a fruit exhibit at Chicago?

I cannot close without paying a merited tribute to the able and efficient services of our retiring Secretary, Prof. E. R. Lake, to whose labors this Society is largely indebted for the interesting meetings, increased membership and present prosperity.

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## THE SOILS OF OREGON.

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[By Prof. G. W. SHAW, Oregon Agricultural Experiment Station.]

Considerable time was spent last year in the Chemical Department of the station in some investigations concerning Oregon soils. This work was undertaken because a knowledge of the soil, with its characteristics, lies at the very foundation of agricultural progress, and for this reason also it is too important a branch to be longer neglected. This fact is also being realized by other stations throughout the country, and they are now turning their attention to this line of work, among the most prominent of which may be mentioned Maryland, Louisiana, and California.

A second reason for undertaking the work was that the data obtained might be used in a more complete agricultural and mineral

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NOTE.—The writer wishes to express his thanks to Mr. Dumont Lotz, the assistant chemist, for the excellent manner in which he has performed the greater part of the analyses given in this Bulletin.

survey of the State which it is hoped the Station may conduct as fast as the funds will allow.

It is well known that as to the benefits to be derived from *soil analysis alone* chemists are divided, while it is doubtless true that the general public attaches undue importance to it. The two opinions are held by equally strong adherents. The main ideas advanced by the opposition are the impossibility of securing a sample which will represent a general average; the difficulties in establishing a rule for determining deficiencies of plant food, because of the very material difference in the physical properties of the soil. The other side is equally ardent in the claim that there are vast tracts of land in the various states which are practically the same, of nearly uniform composition and physical condition, and that if a sufficiently large number of analyses are made, it is possible to establish a minimum limit for plant food elements. Prof. Hilgard, of the California Station, has shown that this is undoubtedly true of "virgin soils."

The opinions of the first class were the outgrowths of incorrect views put forth in the beginning of agricultural chemistry, and from the fact that the results were obtained from worn-out soils of the East and Europe. When, however, attention was directed to the soils of our newer States and Territories, a different question was involved, and the translation of results obtained from *chemical and physical examinations combined* became a different matter.

In our Western States, farmers, as a rule, have hardly brought their wild lands under cultivation, and the lands not having been exhausted, artificial fertilizers are very little used, but of late there has been an increase in the number of inquiries concerning them. Twenty years hence a scientific knowledge of fertilizers and the various soils will be necessary to successful farming in many portions of the Northwest. Again, the methods of dealing with our alkaline soils is a problem which of itself presents a broad field for study, and together with this comes a study of the irrigating waters of the State.

We see the necessity of thus early in the work beginning to investigate along the above lines, and especially as to the mechanical and chemical condition of the soil.

The complete study of these questions is one involving a number of years, and only a portion can be carried on at once. This Bulletin, then, simply sets forth the results so far obtained without attempting to draw definite conclusions, which must be left till more data can be obtained and comparisons made.

During the year, several times we have been asked why the Station did not put in simple form some scientific facts concerning

agriculture that the Bulletin readers in the State might the better understand some of the underlying principles with which the scientist has to deal. The law establishing the Station also states this as one of the functions of the workers, "to diffuse among the people useful and practical information on subjects connected with agriculture." In connection with the data of this Bulletin, then, is given some of the recognized facts with reference to soils and their relation to agriculture with the hope that they may be of service to some farmers.

#### GEOLOGY AND AGRICULTURE.

The subjects, chemistry, geology, and agriculture are so closely bound to each other that it is almost impossible to deal with one without crossing the line into the others. Although the rocks of any given formation may be quite different petrographically from others of the same formation, yet there are certain laws governing the different ages which furnish a comparatively safe guide in deciding to what general class soils belong. When the term "soil" is used it must be borne in mind that the word may be taken in two senses, the one meaning simply that medium in which plants grow; the other, and the more perfect definition, implying not only that medium, but also that from which is derived more or less plant food. It is in this latter sense that we speak of the soil in this Bulletin.

The surface of a country is divided by geologists into divisions according to the nature and characteristics of the rocks from which it is formed. The composition of each group of rocks is found to be quite uniform, and underneath their respective soils are found outcropping the various divisions of the rocks themselves.

#### ORIGIN OF SOILS.

Soils are formed by the natural disintegration of rocks, and signify that portion of rocks which after it has rotted down has been permeated by the air (and mixed with organic matter), and thereby has been changed, for the most part, to a class of compounds known as oxides, which are compounds of the various elements found in the rock with the oxygen of the air, which plays a very important part in the disintegration of the rock. By the formation of these compounds the cohesion is weakened and the minerals making up the rock fall apart, and finally are worn to an impalpable powder. Another very active agent in the decomposition of rocks is the carbon dioxide found in the atmosphere—that gas so necessary to plants and thrown off from the lungs of animals as a waste product.

This pulverization and decomposition is known as "weathering,"

and the various agents concerned are water, air, rain, wind, and frost, which are constantly at work on the earth's surface. In the formation of soil, cultivation and vegetation also assist very materially, since they expose fresh surfaces to the action of the various agents. Of course the more rapid changes take place near the surface, but the action is extended even to the hard rock, which, becoming exposed to frequent alterations of dryness and moisture, soon crumbles to fragments. In this connection the mechanical action of falling rain must not be forgotten, which, especially when heavy, washes away great quantities of surface soil, leaving fresh surfaces exposed to the formative agents. In short, suffice it to say that by the combined chemical and mechanical action of all these forces the parent rock is changed into the plant-supporting soil. This is well illustrated today in the formation of soil from the hard volcanic lavas of comparatively recent eruptions in our own State.

Soon after disintegration has begun the simplest form of microscopic vegetable life begins, and everywhere the soil is teeming with a great variety of forms of life which assist in preparing the soil and making it suitable for the various crops. Although the individuals producing these important changes are extremely small, their countless numbers fully compensate for their size. When the organisms have done their work they die and their remains are left to form the necessary organic matter in the soil. From the putrefaction of these and other vegetable accumulations is formed a black mold called "humus."

During the decay of this matter the carbon unites with the oxygen to form carbon dioxide; the hydrogen unites with the nitrogen to form ammonia; and the ammonia undergoes further change resulting from the action of minute oxidizing germs which change the ammonia into nitric acid. The process of nitrification resulting in the conversion of ammonia into nitric acid through the action of living microbes, occurs only in the upper strata of the soil where access of oxygen for supporting the existence of the acting organisms is greatest; and is of a necessity increased by the porosity of the soil and by exposing new surfaces to action. The most recent Rothamstead experiments demonstrate that little or no nitrification occurs in the subsoil, 2-3 feet being evidently the extreme depth at which the phenomenon occurs. The nitric acid of the soil below this depth is doubtless carried thither in the drainage or by diffusion.

The depth at which nitrification may occur, however, is capable of considerable variation, not only because of the physical condition of the soil and access of oxygen, but depends largely on the character of the crop grown, leguminous plants, like the vetch and the



clover, seeming to possess the property of considerably increasing not only the depth at which the transformation may occur, but also the activity of nitrifying organisms.\*

Just how these plants bring about this change is not well understood, but this general fact is of vast agricultural importance, and has given this group of plants—the leguminosæ—the term of “nitrogen gatherers.”

There are a large portion of our soils that are not formed by decomposition of rocks in place, but are the results of water deposition, either fresh or salt, being made of material prepared elsewhere and finely abraded from erosive action. In all running water fine material is carried to a lower level and the streams are continually moving soils from one place to another. These “alluvial soils,” or “bottom lands,” are of the most fertile nature from reasons which are very obvious.

CLASSIFICATION AND COMPOSITION.

The great bulk of soils is sand and clay, and upon the variable amounts of these materials is based their popular classification. The sand and clay comes for the most part from the decomposition of the underlying rocks. The gradations between sandy and clayey soils are roughly expressed by such terms and distinctions as the following:—

	Per cent of clay or impalpable matter.	Per cent sand.
Heavy clay.....	75 to 90	10 to 25
Clay loams.....	60 to 75	25 to 40
Loam.....	40 to 60	40 to 60
Sandy loam.....	25 to 40	60 to 75
Light sandy loam.....	10 to 25	75 to 90
Sand †.....	0 to 10	90 to 100

Analyses of two typical soils of the State will serve to show the component physical parts. Soil 1 is from The Dalles, and represents a great extent of country. Soil 2 is one very common in the Willamette Valley, and was taken from the foothills south of Eugene.

	No. 1.	No. 2.
(1) Coarse sand.....	30.4	80.5
(2) Sand.....	24.0	2.5
(3) Fine sand.....	12.2	3.0
(4) Silt or clay.....	33.4	14.0

The remainder of mineral matters in the soil—not amounting to more than five pounds in one hundred of soil—consists of chemical compounds of lime, potash, soda, magnesia, iron, aluminum, manganese, chlorine, silicic acid, phosphoric acid, sulphuric acid, nitric acid, and carbonic acid and water in varying proportions. Of the greater portions of the soil the plant makes no use except as a

\* Stockbridge's Rocks and Soils. † Johnson's "How Crops Feed."

medium in which to fix its roots. It is the compounds of the above substances that constitute the plant food in the soil. The acids above mentioned are united with the bases to form the salts which occur as chlorides and silicates of potassium and sodium, calcium (lime) sulphate, phosphates of iron, calcium, magnesia, manganese and ammonium, and probably salts of soda, potash, and lime, with certain vegetable acids.

There are only three of these, lime, phosphoric acid, and potash, which as a rule require attention so far as deficiency of plant food is concerned, for the other mineral substances are furnished in abundance by natural agencies. It must be remembered, however, that it is only the soluble portion of the material that the plant uses for food. It is these substances then that invite our attention. Just what constitutes a sufficiency of these materials for successfully growing a crop will differ somewhat with the nature of the crop and the physical condition of the soil. In an article published in 1881, Prof. Hilgard, than whom no one is more competent to judge, states the following as to the minimum percentage for a thrifty growth of general crops:—

*Lime.*—0.10 % in the highest sandy soil; 0.25 % in clay loams 0.80 % in heavy clay soils, and it may rise with advantage to 1 % or 2 %. [The present indication is that we may consider 0.40 % as a fair average for soils in the Willamette Valley. G. W. S.]

*Phosphoric Acid.*—In sandy loams, 0.10 % when accompanied by a good supply of lime. The maximum found in the best Mississippi table lands was 0.25 %; in the best bottom land of the same region, 0.30. His investigation in connection with the Northern Pacific survey also showed that this ingredient was more abundant in the soils of Oregon and Washington than in the soils of California.\* In the basaltic soils it may even run as high as 0.30 % or more.

*Potash.*—The potash percentage of heavy clay upland soil and clay loams ranges from about 0.8 % to 0.5 %; lighter loams from 0.45 % to 0.30 %; sandy loams below 0.30 %, and sandy loams of great depth may fall below 0.10 %, consistent with good productiveness and durability. Virgin soils with a less percentage than .06 % he finds deficient. The same author also says in another article that no virgin soil having .50 % or over of potash will wear out first on that side of the store of mineral plant food; and much less will suffice in the presence of much lime and humus.

*Sulphuric Acid.*—In the best soils this ingredient is slight, 0.02 % is adequate; but it frequently rises to 0.10 %.

*Iron.*—He puts 1.5 to 4.0 as the ordinary percentage of ferric

\*Cal. Exp. Station Report, 1888.

oxide in soils but little tinted; ordinary loams from 3.5 to 7.0; highly colored red lands, 7 to 12, and sometimes upwards of 20.

*Humus.*—This is of great interest to us since it is the storehouse of the nitrogen supply, and its determination serves as a measure of the nitrogen. In oak uplands of the cotton States the range is usually between .70% and .80%; in the poorer sandy soils, from .40% to .50%; in black calcareous soils, 1.02% to 2.80%. In Western Oregon it is not uncommon to find 3% and even 6%.

Whether or not the above are applicable to the soils of Oregon remains to be ascertained from a sufficient number of examinations from various portions of the State, and other data that may be collected, and this is a portion of the present work of the Station.

That comparison may be made the analyses of a few typical soils are given below:—

	17—Eugene, Lane Co.— Foothills	19—Tuleton, Benton Co.— Bottom land	17—College Farm, Benton Co.— Alluvial
Insoluble matter.....	63.02	52.72	72.76
Soluble silica.....	8.77	14.54	5.98
Potash (K <sub>2</sub> O).....	.09	.33	.47
Soda (Na <sub>2</sub> O).....	.07	.06	.24
Lime (Ca O).....	.60	.27	1.69
Magnesia (MgO).....	.27	.25	1.03
Magnesia (Mn <sub>2</sub> O <sub>4</sub> ).....	.02	.20	.10
Iron (Fe <sub>2</sub> O <sub>3</sub> ).....	15.90	18.31	9.28
Aluminum (Al <sub>2</sub> O <sub>3</sub> ).....			
Sulphuric acid.....	.02	.03	.30
Phosphoric acid.....	.16	.12	.06
Water and organic matter.....	10.51	12.90	8.09
Total.....	99.43	94.76	99.33
Humus.....	1.21	1.16	.76
Soluble phosphoric acid.....	.12	.37	0.37

The above serve to give an idea of soil composition. For further illustrations the reader's attention is directed to other pages in this bulletin.

#### TOPOGRAPHICAL AND GEOLOGICAL.

The State, comprising an area of 96,000 square miles, lies between 117° and 125° west longitude, and 42° and 46° north latitude. It is naturally divided into eastern and western Oregon by the Cascade Mountains. The eastern portion is about 3,000 feet above the level of the sea and embraces about two thirds of the State. That part of the State together with a part of Washington often goes by the name of the "Inland Empire," since it is so surrounded by various mountain systems. The western portion may be well divided into a northern and southern portion, the first of which comprises

the great Willamette Valley and a portion of the Coast Mountains. Throughout the entire western portion of the State there is a multitude of small streams furnishing an ample flow of water during the entire season. The Willamette Valley, embracing about 5,000,000 acres, is by far the largest valley in the State. It is about 130 miles in length by 60 in width and extends from a low range of hills on the south (Calipooias) to Portland on the north. To show how well watered is this valley it may be stated that over 40 streams feed the Willamette in its course, and the stream is navigable for about 100 miles from its mouth.

The soils of this valley may be classified under two general heads, viz., those of the foothills, and those of the bottom lands extending on each bank of the river. The former comprise a belt of rolling land extending nearly around the prairie and merging into the mountains. The prevailing soils are of basaltic origin mixed with more or less sandstone soil on the west side. The purely basaltic soils are mostly confined to the hill tops where they are generated. All the "bottom land" is of an alluvial nature and varies greatly in depth, from a few inches to many feet. It is made up of the washings from the hills, and consists, as one would infer from above, of a decomposed volcanic substance, somewhat basaltic in nature, mixed with sand and a large amount of alluvial deposit and vegetable mould or "humus," the last named substance being the more abundant in this portion of the State because of the larger rainfall.

It is a fact noticed in Italy long since, and borne out by experience in this Northwest, that the soils of volcanic origin are of an unsurpassed fertility. The basalt from which much of the soil in Oregon is derived is not like most rocks in respect to its makeup, for it contains from the very nature of the case the fertilizing ingredients of a combination of rocks. Basalt is a complex mineral and a type of basic rocks. It is a very dark, almost black rock, exceedingly hard and quite heavy; mineralogically it is made up of plagioclase (a soda-lime feldspar) augite, and olivine; it also nearly always contains more or less magnetic iron ore and other minerals. The coarser grained basalts are known as dolerytes, and the fine grained, anamesyte. Chemically the rocks contain silica, lime, potash, soda, magnesia, oxides of iron and manganese, and alumina. There is one quite notable feature as to one of the mineral ingredients of basalt—augite—that it not infrequently contains considerable phosphoric anhydride ( $P_2O_5$ ), occurring in a crystalline form as apatite. Of such an occurrence one writer has said: "While such crystals scattered in the soil may be somewhat refractory in dissolution, yet the mechanical and chemical process

of soil formation must have supplied an abundance of finely pulverized mineral ('floats') available for the use of vegetation." The chemical composition of this rock, from which has been derived the greater portion of our soils, explains why the apparently barren soils of the eastern portion of the State, when supplied with the necessary moisture, are so very productive. In spite of the fact that some of the books published state that basalt forms soil very slowly, yet the rocks are really fragile and short-lived. They appear to be dense and lasting, but being complex in structure and containing a considerable amount of protoxide of iron, which is capable of further oxidation, and this quite rapidly, forming a sesqui-oxide, the bonds of the minerals are loosened and the rock breaks up. At the foot of every basaltic cliff is found a pile of débris and all over the basalt country this crumbling proceeds regularly and comparatively rapid. These rocks are of recent geological origin and doubtless represent the same time as those forming the Sierra Nevadas, the material being deposited in the Jura-Trias and elevated as mountains in the middle of the Mesozoic, while the formation of the Coast Range did not occur till about the end of the Middle Tertiary or Miocene, the place of the range having a marginal sea bottom and received sediment from the beginning of the Cretaceous. At the end of the Miocene, this marginal sea bottom yielded to pressure and swelled up into the Coast Range of today. This enclosed between it and the Cascade Range an immense body of water which after a time became fresh giving fresh water sediment. These alluvial deposits were elevated and drained off, the Willamette valley being the latest to become land. These changes just mentioned, however, were not the ones which primarily gave us the immense quantities of basalt, but rather the great laval overflow, and the lesser and subsequent ones which covered the whole of northern California, a great part of Oregon, Washington, and Idaho, and extending into Nevada, the violence of this volcanic fire and molten lava destroying and blotting out all forms of vegetable and animal life, the entire Northwest being covered from 25 to 100 feet deep in volcanic ashes. The lava beds where the great Columbia has made its cuts show a depth of about 3,000 feet. Over this entire field are found numerous extinct volcanoes, which for some time continued to belch forth their molten contents, those of the more recent activity being Mts. Hood, St. Helens, Pitt, Adams, Jefferson, and Cowhorn Peak.

The above all represent marine deposits, while in both the southern and eastern portions of the State there are numerous localities showing fresh-water lake deposits. During the laying down of much of this alluvial soil the ocean extended up the Columbia

River forming an immense sound, which is shown not only by numerous beach marks but also from the successive terraces. An extensive bay, the deposits of which formed the present subsoils of the region of Forest Grove, Hillsboro, etc., covered these places to a considerable depth.

As we pass into the southern division of western Oregon, Mesozoic strata are prominent, and during this time nearly all of southern Oregon was probably under water, and not less than 3,000 feet of sediment was deposited covering nearly all of the entire region of the Rogue, Coquille, and Umpqua Rivers, the water being drained off probably early in the Miocene, if not before. Between the Umpqua and Rogue Rivers toward the south the formation is chiefly metamorphic slate and quartzite, while to the north there is much conglomerate and slate with more or less serpentine; the latter is very abundant on the south Umpqua. To show the depth of these strata, a well bored 175 feet near Jacksonville failed to reach beyond the sediment of the Tertiary.

As the rocks, so the soils here are quite varied, and it is not uncommon to find a half dozen different soils on 160 acres. The predominating soil of this portion seems to be a red clay which terminates in the high plateaus. Black loams with vegetable debris are found along the principal valleys, where granitic soil is not uncommon.

The analysis of a characteristic black loam soil from the farm of J. D. Wilson, Yoncala, Douglas county, is given below:—

## SOIL FROM DOUGLAS COUNTY.

<i>J. D. Wilson, Yoncala.</i>		1X.—Black loam
Coarse material > .6 mm.....		45.40
Fine earth.....		54.60
Moisture absorbed at 15 c.....		1.24
Capacity for water.....		42.00
ANALYSIS OF FINE EARTH.		
Insoluble matter.....		39.58
Soluble silica.....		10.43
Potash (K <sub>2</sub> O).....		.44
Soda (Na <sub>2</sub> O).....		.26
Lime (CaO).....		2.05
Magnesia (MgO).....		.42
Manganese (Mn <sub>3</sub> O <sub>4</sub> ).....		.08
Iron (Fe <sub>2</sub> O <sub>3</sub> ).....		.45
Alumina (Al <sub>2</sub> O <sub>3</sub> ).....		29.45
Sulphuric acid (SO <sub>4</sub> ).....		.01
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> ).....		.16
Carbonic acid (CO <sub>2</sub> ).....		.16
Water and organic matter.....		17.21
Total.....		100.09
Humus.....		1.3

The above soil, it will be noticed, is somewhat peculiar, as it carries such a heavy amount of soluble silica as well as iron and alumina; yet a high percentage of soluble silica is not uncommonly found with high percentages of iron and alumina. The soil carries a large supply of phosphoric acid; especially is this true since the soil has an abundant supply of lime. There is a fair amount of potash; yet if we can judge from remarks on page 7 the soil will wear out first on that side, yet it will not be deficient for some time. It seems to have the elements of a good all around soil.

The foregoing points on the geology of the State have been given since it is more or less important in beginning work on the soils to have at least an outline of the geological nature of the State, and it is hoped that the work along this line may be extended further in the near future.

The record of examination of a number of the soils is found below, and in connection with these analyses it will be desirable for the reader to again refer to page 7.

WESTERN OREGON SOILS.

Most of the following soils represent quite an area, and the analyses will no doubt be of interest and value to a large number in the vicinity whence the sample was taken, yet, as stated before, a large number of analyses must be made before comparative results can be had:—

SOILS FROM WASHINGTON COUNTY.

	No. 1 C— <i>Rosed Grove, H. Burton.</i>	No. 1 D— <i>Ditto.</i>	No. 1 F— <i>Gales creek, A. Powell.</i>	No. 1 G— <i>Ditto.</i>	No. 1 H— <i>Ditto.</i>	No. 1 I— <i>Rose Hill, Oak Hill.</i>
Coarse material > .6mm	1.00	3.00	51.94	34.00	19.00	33.00
Fine earth	99.00	97.00	48.06	66.00	81.00	67.00
Capacity for water	58.40	8.00	50.80	40.80	50.00	45.00
Hygroscopic moisture (15° C.)	5.05	1.42	3.30	6.50	4.72	8.30
ANALYSIS OF FINE EARTH.						
Insoluble matter	76.19	75.06	65.89	67.40	67.99	63.62
Soluble silica	4.49	3.76	5.82	5.18	3.22	9.74
Potash (K <sub>2</sub> O)	.08	.16	.12	.28	.26	.11
Soda (Na <sub>2</sub> O)	.01	.00	.06	.08	.07	.08
Lime (CaO)	.34	.63	.76	.13	.76	1.47
Magnesia (MgO)	1.71	1.18	.71	.90	.71	1.27
Manganese (Mn <sub>3</sub> O <sub>4</sub> )	.22	.21	.04	.04		.22
Iron (Fe <sub>2</sub> O <sub>3</sub> )	8.76	7.58	17.50	17.68	18.13	12.88
Alumina (Al <sub>2</sub> O <sub>3</sub> )						
Sulphuric acid (SO <sub>3</sub> )		.05		.08	.08	.04
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> )	.08	.32	.09	.34	.34	.30
Water and organic matter	8.51	11.62	9.81	7.99	8.74	9.80
<b>Total</b>	<b>100.29</b>	<b>100.57</b>	<b>100.79</b>	<b>100.07</b>	<b>100.30</b>	<b>99.54</b>
Humus		.20	1.87	1.76		.32
Soluble phosphoric acid		.19	.05			.02

1 C.—The average depth of the soil is about three feet. It is a mixture of decomposed soapstone with some sand and feldspar. It is a gray loam, which darkens considerably on wetting and becomes fairly plastic on kneading. In looking at the analysis of the soil, the most striking feature is the very low percentage of potash and phosphoric acid, and were these not in a very available form and that it was well supplied with lime, it would be considered deficient in these ingredients. That these ingredients are in an available form is shown by the fact that soil from the same general locality has produced good crops for a long series of years. The high percentage of magnesia is consistent with the soil's origin.

1 D.—This is a stiff red clay, and very waxy. The dry lumps are almost impossible to crush, and darkens only slightly on moistening.

1 F., 1 G., 1 H.—These soils are of a reddish color and are quite lumpy. They do not blacken to any extent when wet, but become very sticky. There is considerable iron oxide in the soil, together with quartz and feldspar, with some hornblende. These soils are commonly called "shot-lands," since the iron oxide with particles of clay have formed small nodules which to some extent resemble shot, which by continued wear in cultivation disappear. This so-called "shot-land" covers quite an area of hill country, and as the bottom-lands are approached the shot become less. The natural growth on this soil is fir, alder, and maple. It is a soil which produces well, and one which is easily worked.

1 L.—This soil is somewhat similar to the last three described, but contains less "shot," belonging to the same class of soils, however. The soil in this part of Washington County is nearly all of this character in the foothills. It has a range of from 10 to 20 feet in depth. In general, the water is soft, and in many places are found springs which contain more or less iron. From the depth and porosity the soil would not be called deficient in potash, but this is the ingredient which is likely to need the most careful attention.

#### SOILS FROM BENTON COUNTY.

The soils of Benton County in general resemble those of the other portions of the Willamette Valley, especially those of Polk County. The prairie bottoms are of a rich dark loam, for the most part. There is quite a body of what is called "white land," which is found in various lowlands of the valley. It is a heavy whitish clay, destitute of natural drainage. The great trouble with the land is excessive moisture, but where well drained it seems to give fairly good results.

The hill lands are of a reddish soil of excellent physical condition



for working, and offer most excellent soils for fruit. The bottom soils are made up of the washing from the hills added to the clays and loams from the former sedimentary deposits.

The analyses of the Benton County soils given below are from representative samples, and may be taken as showing in general the composition of their respective kinds. The first two were taken from the College Farm, and their analyses are as follows:—

SOILS FROM COLLEGE FARM, CORVALLIS.

	No. 11. College Farm— "adobe."	No. 1J. Ditto—Clay.
Coarse matter > .6 mm.-----	2.25	1.75
Fine earth-----	97.75	98.25
Capacity for water-----	56.00	44.20
Hygroscopic moisture (15C)-----		3.94
ANALYSIS OF FINE EARTH.		
Insoluble matter-----	38.91	
Soluble silica-----	16.74	72.70
Potash (K <sub>2</sub> O)-----	.11	5.98
Soda (Na <sub>2</sub> O)-----	.08	.47
Lime (CaO)-----	1.60	.24
Magnesia (MgO)-----	1.78	1.60
Manganese (Mn <sub>2</sub> O <sub>4</sub> )-----	.08	1.03
Iron (Fe <sub>2</sub> O <sub>3</sub> )-----	28.21	.10
Alumina (Al <sub>2</sub> O <sub>3</sub> )-----		9.23
Sulphuric acid (SO <sub>3</sub> )-----	.01	.03
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> )-----	.09	.05
Water and organic matter-----	17.44	8.00
Total-----	100.00	99.38
Humus-----	1.80	.76
Soluble phosphoric acid-----	.02	.03

For the sake of comparison the analysis of a California "adobe soil" is placed alongside that from the College farm.

	No. 11. College Farm— "adobe."	Valley adobe soil, Tuolumne County, Cal.
Coarse material > .6 mm.-----	2.25	
Fine earth-----	97.75	
Capacity for water-----	56.00	
Hygroscopic moisture (15C)-----		15.42
ANALYSIS OF FINE EARTH.		
Insoluble matter-----	38.91	
Soluble silica-----	16.74	55.61
Potash (K <sub>2</sub> O)-----	.11	.19
Soda (Na <sub>2</sub> O)-----	.08	.14
Lime (CaO)-----	1.60	.68
Magnesia-----	1.78	13.74
Manganese-----	.08	.08
Iron (Fe <sub>2</sub> O <sub>3</sub> )-----	28.21	18.43
Alumina (Al <sub>2</sub> O <sub>3</sub> )-----		
Sulphuric acid-----	.01	.01
Phosphoric acid-----	.09	.07
Water and organic matter-----	17.44	9.84
Total-----	100.00	99.79
Humus-----	1.80	1.61
Soluble phosphoric acid-----	.02	.40

Of the Tuolumne County soil the California report says: "The adobe soil is quite remarkable for its unusually low contents of potash and a most extraordinary proportion of magnesia. \* \* \* The soil has a fair proportion of lime and phosphoric acid, as well as a high one of humus, and while the potash holds out it should produce well, but should have the most thorough tillage."

The "adobe" soils become exceedingly sticky when wet, and are difficult to work, in fact it is impossible to work them unless taken just at the right point of moisture. It is underlaid by a heavy stiff clay. If the soil is thoroughly tilled it retains moisture well. The main difficulty with this land lies in its poor drainage. If some inert material could in some way be worked into the soil it would render it materially easier to work. The tillability of the soil would be greatly improved by as much lime as could be afforded. It is for this use that large quantities of gypsum could be used could the supply be had at reasonable rates. Anyone finding any indication of gypsum would not only benefit himself but also largely aid our agricultural interests by reporting and investigating the same. The Station is always ready to assist so far as possible in any such line of work.

Improvement of the physical condition of the "adobe" soils is a question for experiment. Underdrainage, so important in all such lands, would probably correct to a large extent, and green manuring would be an aid.

While soil 1 I has even less phosphoric acid than the California soil it also carries a heavier percentage of humus and of lime. From the greater amount of lime a less amount of phosphoric acid would suffice, yet it would seem that this ingredient should receive careful attention. It is intended to conduct experiments during the year as to the relation of "adobe" soil to moisture.

1 B.—This is an alluvial soil sent by Mr. C. J. Bishop of Tidewater. The soil is about four feet deep and of a brownish color. As is shown by the mechanical analysis, the soil is of fine texture, the coarse material consists almost entirely of organic matter, sticks, etc. The soil shows a considerable portion of decomposed feldspar. The lumps crush easily between the fingers. The natural growth of trees is cedar, red and yellow fir, alder, and maple, for shrubs and grasses, the vine maple, salmon berry, and native clovers. On account of depth and physical condition it seems to be an excellent soil for roots, but the supply of potash is limited.

1 M and 1 N.—Except so far as the difference in chemical composition is concerned these soils are described as in 1 B. They carry less lime and phosphoric acid, which should be present in at least 10% to give the most satisfactory results.

1 O and 1 P.—These run very closely together, 1 P however,

being a little the heavier soil, and having, as would be expected, the greater moisture coefficient. The supply of potash in each is fair and of phosphoric is good.

BENTON COUNTY COAST SOILS.

	Bottom land.				Hill land.		Tide land.		Bench land.
	No. 1 B.—Tidewater. C. J. Bishop.....	No. 1 M.—Toledo. H. Rosebrook.....	No. 1 N.—Ditto.....	No. 1 Q.—Higher Ditto.....	No. 1 O.—Ditto.....	No. 1 P.—Ditto.....	No. 1 T.—Ditto.....	No. 1 U.—Ditto.....	No. 1 S.—Toledo. H. Rosebrook.....
Coarse material > .6 mm.....	1.01	3.40		20.00	7.40	16.31	None	2.90	.....
Fine earth.....	98.99	96.60		80.00	92.60	83.69	All	97.10	.....
Capacity for water.....	67.00	24.00		36.00	70.00	76.00		60.00	.....
Hygroscopic moisture.....	10.00	4.99		6.94	1.08	11.74	2.65	9.96	5.00
ANALYSIS OF FINE EARTH.									
Insoluble matter.....	63.43	63.38	60.00	52.72	59.98	50.96	65.43	63.09	57.01
Soluble silica.....	8.60	8.15	9.40	14.54	9.74	9.52	7.44	6.37	11.43
Potash (K <sub>2</sub> O).....	.10	.12	.19	.33	.29	.88	.22	.33	.16
Soda (Na <sub>2</sub> O).....		.22	.10	.09	.09	.04	.31	.53	.10
Lime (Ca O).....	1.40	.63	.43	.27	.31	.30	.45	.27	.42
Magnesia (MgO).....	1.65	.82	1.54	.25	.52	.40	2.04	.52	.98
Manganese (Mn <sub>2</sub> O <sub>3</sub> ).....	.09	.06	.08	.20	.08	.10	.10	.08	.06
Iron (Fe <sub>2</sub> O <sub>3</sub> ).....	13.44	14.96	15.94	18.31	16.50	23.37	14.69	11.25	14.70
Alumina (Al <sub>2</sub> O <sub>3</sub> ).....		.02	.03	.03	.02	.04	.02	.01	.01
Sulphuric acid (SO <sub>3</sub> ).....		.08	.06	.12	.21	.33	.12	.11	.18
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> ).....	.27								
Carbonic acid (CO <sub>2</sub> ).....									
Water and organic matter.....	10.62	12.00	12.53	12.90	12.15	14.17	10.32	13.07	14.60
Total.....	99.60	100.34	100.30	99.76	99.89	99.61	100.14	100.63	99.64
Humus.....	1.74	.91	1.26	1.17	1.61	1.89	1.89	1.96	.88
Soluble phosphoric acid.....		.01	.05	.07	.06		.09	.06	.13

## SOILS OF LANE COUNTY.

This county has an area of about 7,000 square miles, with an average breadth of about 50 miles and being about three times the distance in length. About three fourths of this county is hilly and mountainous. The table or hill lands bordering the valleys seem to be quite fertile, and produce well when brought under cultivation. A sample of this soil is the only one yet examined from this county, and whether all will show as low percentage in potash as this is somewhat doubtful.

## NO. IV.—SOIL FROM LANE COUNTY.

Coarse material > .6 mm.....	5.70
Fine earth.....	94.30
Capacity for water.....	60.00
Hygroscopic moisture.....	2.00

## ANALYSIS OF FINE EARTH.

Insoluble matter.....	63.02
Soluble silica.....	8.77
Potash (K <sub>2</sub> O).....	.09
Soda (Na <sub>2</sub> O).....	.07
Lime (CaO).....	.60
Magnesia (MgO).....	.27
Manganese (Mn <sub>3</sub> O <sub>4</sub> ).....	.02
Iron (Fe <sub>2</sub> O <sub>3</sub> ).....	15.90
Alumina (Al <sub>2</sub> O <sub>3</sub> ).....	
Sulphuric acid (SO <sub>3</sub> ).....	.02
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> ).....	.16
Water and organic matter.....	10.57
<b>Total.....</b>	<b>99.43</b>
Humus.....	1.21
Ash.....	1.12
Soluble phosphoric acid.....	.04

The mechanical separation of the soil by an elutriating apparatus gave the following result: (See page 6, No. 2.)

IV. The soil is a sandy loam and covers several sections in the foothills south of Eugene. Farther up the hills the soil becomes coarser and is underlaid with soft sandstone, which crumbles on short exposure. The vegetation is oak and wild grasses. The soil evidently has a good natural drainage and is easily worked. The dry lumps crush easily between the fingers, and the soil does not become very sticky when wet. It is a soil that has been planted to fruit considerable of late. The physical condition of the soil would seem to warrant this, but the low percentage of potash would indicate that for the best results this ingredient will be needed in a few years.

The county is abundantly supplied with streams and springs. Considerable swale land is found in some parts of the county, mainly white land, but with good drainage this can be made productive. Taking Eugene as a starting point, then going west about six miles, is a low range of hills. From here we can look north for about 24 miles over a rich prairie through which flows the Willam-

ette River, the course of which is rendered the more visible by the groves of balm, maple, and shrubs. The hill land of the principal portion begins about twenty miles west from Eugene and is largely covered with fir timber—in fact, the whole region abounds in forests of fir, hemlock, and cedar.

Further analyses from this rich section will shortly be made.

#### SOILS OF LINN COUNTY.

Of Linn County there are only about 1,300 square miles that is suitable for agricultural purposes. "The arable portion of the county is about evenly divided into prairie and rolling land. The prairie is not a dead level, but slightly undulating, affording plenty of slope for good drainage to the Willamette River, which bounds the county on the west along its whole length. The soil of the prairie lands is a rich, dark, clayey loam, of the general character of that of the whole Willamette Valley." For the most part the soils are sandstone and basaltic. About the Santiam country the formations are porphyritic and granitic, which are a continuation of similar rocks to the north and south—a part of the same that outcrops on the west of the Cascades. Only one soil has been analyzed from this county.

#### IW.—SOIL FROM LINN COUNTY.

Coarse material > . 6 mm. ....	32.90
Fine material.....	77.10
Capacity for water.....	44.00
Hygrosopic moisture.....	7.55

#### ANALYSIS OF FINE EARTH.

Insoluble matter.....	57.82
Soluble silica.....	7.23
Potash (K <sub>2</sub> O).....	.15
Soda (Na <sub>2</sub> O).....	.07
Lime (CaO).....	3.51
Magnesia (MgO).....	.21
Manganese (Mn <sub>3</sub> O <sub>4</sub> ).....	.12
Iron (Fe <sub>2</sub> O <sub>3</sub> ).....	16.89
Alumina (Al <sub>2</sub> O <sub>3</sub> ).....	
Sulphuric acid (SO <sub>3</sub> ).....	.02
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> ).....	.11
Total.....	99.20
Humus.....	1.88
Soluble phosphoric acid.....	.09
Water and organic matter.....	13.07

1 W.—This is a light loam, black in color, sent from Lebanon by Mr. John Withers. The soil to change of color is from 18 to 24 inches, and the subsoil is about two feet deep. The soil grows fir, maple, oak, and ash. As will be seen, it carries a high percentage of lime and clearly shows a lime vegetation. It has a high moisture coefficient, and evidently has good natural drainage. The soil should be easily worked, and though the potash is not high, yet with the heavy percentage of lime it is fairly supplied, and with

thorough tillage is not apt to be deficient in this quarter. It is an excellent all around soil.

SOILS FROM EASTERN OREGON.

Only two soils have been as yet analyzed from this portion of the State. The nature of the rocks and soils has been mentioned on previous pages of this Bulletin, to which the reader's attention is invited. The following table gives the analysis:—

EASTERN OREGON SOILS.

	No. 1 Y.—Cross Kings Crook Co. Linnon.	No. 1 Z.—Ken- necum Ore. A. H. Todd
Coarse material > .6 mm.-----	4.40	.40
Fine earth-----	95.60	99.60
Capacity for water-----	36.00	61.00
Hygroscopic moisture-----	3.85	4.70
ANALYSIS OF FINE EARTH.		
Insoluble matter-----	76.69	65.75
Soluble silica-----	8.47	8.96
Potash (K <sub>2</sub> O)-----	.83	.84
Soda (Na <sub>2</sub> O)-----	.20	.23
Lime (CaO)-----	1.21	.76
Magnesia (MgO)-----	1.11	.94
Manganese (Mn <sub>3</sub> O <sub>4</sub> )-----	.04	.02
Iron (Fe <sub>2</sub> O <sub>3</sub> )-----	9.11	14.85
Alumina (Al <sub>2</sub> O <sub>3</sub> )-----		
Sulphuric acid (SO <sub>3</sub> )-----		Trace.
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> )-----	.08	.07
Water and organic matter-----	8.36	8.09
Total-----	101.09	99.80
Humus-----	.41	1.10
Soluble phosphoric acid-----	.11	.02

1 Y.—As will be seen from the above data this is a soil of very fine texture. It is a light gray soil which darkens slightly on moistening. It is abundantly supplied with potash, but phosphoric acid is deficient. The main growth is bunchgrass and sagebrush, and to one unacquainted with its peculiarities the soil would not be considered favorably, although experience shows that the soils of this same character produce well provided they are given moisture.

1 Z.—This soil in appearance is much like the one mentioned just above. It does not, however, contain so much inert matter, and the supply of humus is better. Like the above, phosphoric acid is present only to a very limited extent. Yet, since these soils have a good supply of lime, the conditions are the more favorable on that account.

In conclusion of this the first of a series of Bulletins on this im-

portant subject of soils, it should be said that in the present state of our knowledge on this subject and the data in hand, it is often impossible to go beyond conjecture on some questions, yet by multiplying the results on the one hand, and by careful observation on the other the future work and benefit to be derived will be very much aided, and the results will be all the more hopeful to the agricultural industry of the State.

#### APPENDIX.

Since the Station receives so many inquiries as to what it is prepared to do, and also that the Chemical Department may be of the greatest possible use to the citizens of the State and come in closer contact with them, these few pages are added. The department also takes this means to answer in a general way a few standing questions which are continually being asked. The Chemical Department of the Station is prepared to analyze and test soils, water, butter, cattle-foods, fertilizers, gypsum, and other agricultural products, and to make such mineral analysis as may be of interest to the State, and as we may have time. Also to give information on such subjects of agricultural science as may fall within its province.

All analyses are made *free of charge* but are subject to the following conditions: 1. All samples for analysis must be taken according to the directions of the Station. 2. All questions concerning the sample will be answered truthfully by the person sending the samples. 3. That the Station is free to publish all results of analyses made for the benefit of the public.

The Station will not undertake work the results of which are not at its disposal to publish.

The laboratory of the Station is complete in all particulars, although not so large as that of many stations. For that reason it is not possible to turn out work so rapidly. It must be borne in mind that to correctly analyze a substance is not a matter of a few minutes, but more often it is a matter of several days' work; and that there is always regular experimental work being carried on which as a rule cannot be interfered with, hence all who send samples must be patient and bide their time. *All samples received are numbered in the order received and so analyzed*, the analysis then being reported to the party sending the sample.

In all cases where samples are sent to the Station for analysis *all charges must be prepaid*.

#### DIRECTIONS FOR SAMPLING.

For ordinary water analysis, one gallon of water should be sent; for mineral water analysis, two gallons. The water should be put

in clean glass bottles, filled completely full, and corked with *clean, new corks*.

Samples of milk should not be less than a pint, and the milk should be thoroughly mixed before a sample is taken, and the bottle completely filled.

Samples of rock, coal, etc., should be so taken as to be a fair average sample, invariably taken from below the surface.

Fertilizers are sampled by taking a quantity from the top, middle, and bottom, intimately mixing on paper. They should be sent in *clean, dry bottles, well corked*.

It is essential that the fertilizer sample be certified to, and certificates for this purpose will be furnished by the Station. Each sample of fertilizer must be accompanied by the following data: 1. Sampler's name. 2. Brand. 3. Name and address of the manufacturer. 4. Name and address of the dealer. 5. Date of taking sample. 6. Price per pound, ton, or package. 7. For what purpose used. 8. Percentage of valuable ingredients claimed by manufacturer or dealer. 9. Such other information as the Station may require.

Directions for sampling soil will be sent on application.

The department is ever ready to give any information within the province of its work, and solicits the coöperation of those interested in the welfare of the State. All communications relative to analyses and matters pertaining to chemical work should be addressed to G. W. Shaw, chemist, Oregon Experiment Station, Corvallis, Oregon.

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## SOIL TYPES OF THE WILLAMETTE VALLEY.

By Thomas Condon.

### THE WHITE SOILS.

(a) *The bleached soils*—such as those one sees in the southern part of Linn County. The light color here is due to the fact that water has annually stood on them, dissolving and washing away all soluble salts, all soluble carbons, results of vegetable growths and decay; all soluble protoxides of iron, all soluble coloring matter.

(b) *The ashy soils*—such as that one sees on the road from Monroe to Corvallis, and in which a fine gritty ash seems the base. The direction in which this lies from Mary's Butte is evidence that this ash may have come from that eruptive center in the days of its fiery activity, blown eastward and southward by prevailing winds.



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 THE RED SOILS.

In these the color is chiefly due to the presence of iron in some form, directly or remotely shown in the color. This direct or indirect varying may give: (a) *The red lava soil*—where the soil is simply decomposed red lava. (b) *The iron soil*—where the iron in the soil is changed, as we see such change of color in the burning of bricks, simply by increased oxidation of the iron in the soil. Whole ranges of hills in Polk and Marion Counties show this iron soil in rich red surfaces.

## THE BLACK SOILS.

(a) *Black shaly soils*, which are often the direct result of the decomposition of carbonaceous shale.

(b) *Black vegetable mold*—A form of black soil made by vegetable growth, in place, now or formerly. A fine instance of this is seen in what used to be Lake Labish, north of Salem; Beaver Dam, and in smaller area around Wapato Lake, Washington County. In some of these places onion-beds of great value have been made.

These three great types may be indefinitely varied by mixtures with the following characters: 1. Shale, giving the adjective shaly; 2. Sand, giving the adjective sandy; 3. Fine sand, giving the adjective loamy; 4. Clay, giving the adjective clayey; 5. Lime, giving the adjective marly.

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 SOME FUNGUS FOES.
 

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**Botany in Its Relation to Horticulture. What is a Fungus? Economic Fungi of Oregon.**


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Report of the Committee on Botany before the Oregon State Horticultural Society,  
Prof. E. R. LAKE, Chairman.

To the average horticulturist, the value of botany is not generally apparent. And yet, while it is a comparatively young science, it has accomplished some important results, which, justly estimated, make clear its right to be considered the most important factor in horticultural progress.

What improvements in the fertilization of fruits would be made without botanical knowledge and pure botanical work? What would be known today regarding the principles underlying budding, grafting, pruning, and fertilization if no botanical investigations had been made in these directions? In fact, botany is the foundation of scientific and progressive horticulture. It is the

science of plants; that is, it is classified knowledge of plant structure, plant functions, plant diseases—in fact, plant life in all its phases; while horticulture is the practical employment of the principles underlying plant life in the production of plants for utilitarian or decorative purposes. The bearings of one phase alone of horticulture on botany will, to the enlightened horticulturist, make the matter most plain.

Scarcely a month passes but that our attention is called to the fact that another pest is known to affect our plants, trees, and vines. These new foes are not always bugs, beetles, or worms; on the contrary, during the past few years we have been made aware of the fact that many are of a more insidious character. We refer now more particularly to that class of microscopic plants known as fungi, or rusts, smuts, mildews, mold, and blights. These plants—for such they are—in their economic importance to the plant culturist are looked upon as of so much importance that a score or more men of science are devoting their entire energies to the study of their life histories; and during the past five years more real progress has been made in this branch of botany—technically called mycology—than in any other. Its importance to our people can be readily seen by a glance at the work done at Washington of late years. At present there are four persons engaged exclusively in mycological work. A publication, issued four times each year, containing the latest advances on the subject, together with notes and drawings of new species of fungi and comments on experimental work, is gotten out by this department, which is known as the Division of Vegetable Pathology.

Mr. B. T. Galloway, chief of the division, recently made the following statements: "Every plant that the farmer, gardener or fruit-grower cultivates is subject to the attacks of one or more of these parasitic foes. The grape alone has more than fifty of these pests. More than two hundred and fifty species live upon the apple, and it is very probable that more than one third of these are positively injurious. Between two and three thousand grape-growers in all parts of the country used the remedies recommended by the department for the various grape diseases in 1889, and, from estimates based on reports received from about thirty, we know that the actual saving in money to them, above all expenses, was something over \$10,000. Our agents last year, in treating potatoes for blight and rot, succeeded in saving 75 per cent of the crop. On this basis, the amount saved to the entry country, if all the infected districts had been treated, would have been something over a million dollars."

Are not these statements, from one in the best position to know whereof he speaks, significant? Is there not just cause for alarm

and anxiety? Should Oregon remain inactive when such a state of things is found to exist in our plant world? It is idle to think that because we are yet comparatively free from them no caution or vigilance need be exercised. When once these pests get a foothold—as some of them have—in our fields, it will be a never-ending task to keep them in subjection.

Although our orchards and gardens have not yet been ruinously affected by any of these parasitic foes, a few have entered upon the work of devastation, and while their ravages are as yet only apparent to the most observant, it will be only a few years ere whole crops will be wholly or partially destroyed by them. Our climate is most favorable to the propagation of some of these pests, while fortunately for us, it is rather unfavorable for others.

It is not all sufficient to know that great damage is done our cultivated crops by fungi. Something should be known about the thing we call a fungus. That cultivators may the better appreciate the importance of this class of foes, the following popular description of a fungus is given:—

A fungus is a plant of low origin, devoid of chlorophyl—green coloring matter—and drawing its nourishment from living or dead plants or animals. All fungi are separated into two classes—*parasitic* and *saprophytic*. The former class live upon living plants or animals, while the latter class live upon dead or decaying plant or animal matter. It is the parasitic fungi that most concerns the plant culturist, for these are the ones that attack his growing crops. The saprophytic fungi may be considered generally beneficial. They assist in disorganization of waste and refuse matters, and some of them are edible, as the mushrooms. Good illustrations of these two classes of plants as we meet with them in our every day walks would be: Parasitic—rusts, as found on wheats, clovers, and other plants; smuts, as on oats, corn, grasses, etc.; mildews, as on grapes, fruit tree seedlings, and other plants; scabs, as on pears and apples. Saprophytic fungi will be seen as molds on bread, pies, cakes, old shoes and other rubbish, toadstools, puff-balls, mushrooms and various felt-like masses growing on old logs, boards, and other decaying matter.

These fungus plants are also flowerless. Instead of having seeds to reproduce their kind, they produce minute bodies called spores, which in their way reproduce the parent plant. These spores, as found in puff-balls for instance, appear as dust when one of these bodies is vigorously struck or squeezed. The theory of the application of fungicides (substances applied for the prevention or destruction of the growth of a fungus) is to so apply the remedy that when these spores begin to germinate they will be surrounded by a

substance, such as copper, that is poisonous to them while at the same time being harmless to the host plant. If such poison is properly applied the spore upon germinating absorbs some of it and death results. If no application of such substance is made previous to or at the time of germination, then the spore in its germination may enter the tissues of the plant, after which it is practically safe, for then it draws its nourishment from the inner parts of the plant and no application of superficial remedies would affect it. The importance of burning all plants on which any fungi have lived and produced spores is evident; for the more spores we destroy the less will there be to begin the attack the next year.

The following brief list will, to a certain extent, indicate the present status of the fungous diseases as affecting our more common orchard and garden crops:—

**APPLE**—Bitter rot—*Glæosporium fructigenum*. This is a brownish dry rot, appearing in irregular patches on the surface of the fruit and extending into the core and sooner or later throughout the entire tissue. No remedy is known as yet.

*Preventive*.—Destroy all affected fruit.

Powdery mildew—*Podosphera oxycanthæ*. A grayish, powdery mildew found on the leaves of nursery stocks. It was quite common last year, on peach stocks especially.

*Remedy*.—To one quart of concentrated ammonia add 2 oz. carbonate of copper; stir rapidly till the whole forms a clear liquid, then for use, dilute by the addition of water to 25 gallons. Use from three to five times, beginning to apply before the mildew makes its appearance, or about June 15th.

Scab—Black spot—*Fusicladium dendriticum*. Dark brown or blackish patches on both leaves and fruit. It arrests the growth of the attacked portion and thereby causes distortion, thus seriously affecting the value of the fruit. In some sections of our State great loss has been sustained in this direction.

*Remedy*.—At present the experimenters seem to favor the ammonia-copper solution of the strength advised for powdery mildew. However, the following remedy has been found efficacious: Dissolve 2 lbs. copper sulphate (blue vitriol) in hot water; 2½ lbs. carbonate of copper in cold water. Mix the two and dilute to 26-30 gallons by the addition of water. When about to use, add 1½ pints of strong ammonia.

These remedies applied five to seven times have given results that will warrant their use. Applications should be made as soon as the blossoms have fallen or even before the buds have opened.

**BEAN**.—Blight—*Phytophthora Phaseoli*. A grayish white felt-like

mold found coating the pods, also attacking the shoots and leaves. Not serious yet, and no remedy known.

*Preventive.*—Burn all affected plants.

RUST.—A reddish brown rust was observed on the bean plants at the Agricultural College last year. No especial investigation of it has been made. It would be well to burn all affected plants.

CARROT.—Leaf blight, rust—*Cercospora sp.* (?). In the neighborhood of Canby this vegetable has for several years been seriously affected with a rust that blights the leaves and causes the roots to decay. As yet there is no known remedy for the disease.

*Preventive.*—Burn all the diseased roots and tops.

CURRANT.—Mildew—*Sphaerotheca Moru-uva*, probably. This is a downy mildew attacking the young growth and fruit of the currant in some sections of our State. It has not yet become a serious pest, but it is well to give it immediate attention and thereby check its progress. A spray of potassium sulphide—1 oz. of the latter to 4 gallons of water—seems to be about the best remedy known at present. This applied three or four times at intervals of ten days or two weeks is quite effective.

GOOSEBERRY.—Mildew—same as currant, probably; troublesome only to a small extent; same remedy.

GRAPE.—Powdery Mildew—*Uncinula spiralis*. A dust-like mildew, generally appearing early in the season and manifesting its presence by dull whitish patches on the upper surface of the leaves and on the shoots. It lacks the bright, frosty appearance of the downy mildew.

*Remedy.*—Flowers of sulphur dusted on the vines soon after growth begins, again at blossoming, and a third time just before the fruit begins to turn. The applications should be made during warm, bright weather when there is no dew on the plants.

Downy mildew—*Peronospora viticola*.—This mildew differs from the above one in that the first evidences of its presence are seen on the under surface of the leaves, while at the same time it attacks all green parts in the form of grayish white patches, or on the upper surface of the leaf as yellowish brown spots. While this mildew seems to flourish in a damp and warm atmosphere, such as we are likely to have in Oregon during the spring months, powdery mildew seems to do the best in a warm, dry atmosphere, such as we have during our summer months. So that while we must be on the outlook for this one early in the season, the other will need watching later in the season. Only one or two cases of this latter mildew—downy mildew—have been reported, while there is scarcely a locality in Western Oregon in which the powdery mildew cannot be found. Both seriously affect the fruit as well as the plant.

**Remedy.**—Dissolve 1 lb of sulphate of copper in 2 gallons of hot water. In another vessel dissolve 1 lb of carbonate of soda; then mix the two solutions, and when cool add 1½ pints of ammonia, and when ready to use dilute to 24 gallons. Use with a fine spray.

**HORSERADISH.**—Rust. At Beaverton a rust has been noticed on the leaves and roots of this vegetable. The leaves become brownish and die prematurely, while the roots are affected internally by a black dry rot.—*John Henry.*

**PEACH.**—Leaf curl—*Taphrina deformans.* This is a disease too well known to need any description. There is as yet no reliable remedy. Good cultivation, so that the tree may be enabled to put forth new leaves, is the only one recommended. The careful selection of varieties, as demonstrated by California horticulturists, seems to indicate that much may be expected in this direction.

**PEAR.**—Scab—*Fusicladium pirinum.* About the same as apple scab; same effect; same remedy.

**PLUM.**—Plum pockets or bladders—*Taphrina pruni.* This fungus causes the young fruit to become inflated and hollow. These pockets will sometimes grow for two or three months after the fruit is formed, often reaching two inches in length.

**Remedy.**—Destroy the pockets soon after formed along with some of the wood on which they are produced.

**STRAWBERRY.**—Leaf blight—*Sphærella fragaria.* This fungus forms reddish or purplish spots on the leaf, which in the advent of its growth causes the leaves to become blotched.

**Remedy.**—Spray several times early in the season with potassium sulphide as recommended for currant mildew. After the fruit is gathered straw may be scattered over the vines and burned. This does no particular injury to the vines and destroys all affected leaves.

**TOMATO.**—Rot. This disease is a most serious one. Its history is not well understood. There seems to be several fungi concerned in it.

**Preventive.**—Burn all vines having affected fruit.

**Blight.**—*Cladosporium fulvum.* This fungus first shows itself as irregular brownish patches on the under surface of the leaves, followed by more or less pronounced yellow spots on the upper surface. In a short time the leaves shrivel and fall off, the plant slowly dying. This disease has been very troublesome in Eastern Washington. In many instances 60 to 80% of the first plants out have perished.

**Remedy.**—Apply by spray a solution of sulphide of potassium, one-half ounce to one gallon of water. This should be applied ten to fifteen days before the disease is expected to appear.

In the above list no reference has been made to the diseases that affect ornamental and florists' plants. There are many of these latter, but a more extended study of the subject must be allowed before a classification can be made or remedies given.

## OUR NEW FRUITS.

Report of the Committee on New Fruits of the Oregon State Horticultural Society,  
W. S. FAILING, Chairman.

As Chairman of the Committee to report on the new fruits of our State, appointed by your Society, I submit the following, and wish to state that I have not had time to give this subject proper attention and do it justice. I issued sixty circular letters to members of the Society, and others interested in fruit growing, asking for information, and the following is gleaned from the replies.

Commencing with that veteran fruit-grower, Seth Lewelling, of Milwaukie, who has worked longer and done more for the fruit interests than any other one man on this Northwest Coast, I will give, in his own words, his experience, which will be interesting reading:—

"In 1851 I planted some Isabella grape seed, being the only kind of grape seed I had at that time. I succeeded in raising about twenty-five seedlings, one of which—I named Lewelling—proved to be A No. 1. I sent a vine to my brother at St. Helena, Cal., and while at his place in 1878 he told me it was one of his best grapes. It ripens about the same time as the Isabella, but is twice the size of that variety. From this time on I paid considerable attention to the best looking seedlings, with a view to the production of a superior fruit. In 1860 I had three cherry seedlings come up under a Black Eagle tree. In 1862 I planted them in an orchard, and in 1864 one bore a few cherries which were very fine; it being a time of great political excitement, and feeling somewhat patriotic, I named it Black Republican. In 1865 the other two bore fruit, one of which is one of the finest of its season—from the first to the middle of June—while the third was worthless.

"I planted the best seed I could select of apple, pear, plum, and cherry, and raised hundreds of trees to no effect until 1875, when I carefully selected two hundred seeds of the Fellenberg prune and raised many fine trees, all of which proved worthless except one, which was first-class, producing fruit nearly twice as large as the Fellenberg, of golden color and exquisite flavor. My anticipations were so nearly realized that I named it Golden. About the same time I raised five hundred seedlings from seed of Black Republican

and succeeded in getting one that is large and fine, with excellent flavor, a good shipper and which ripens in the early part of July. To please a faithful Chinaman of eleven years' trial, I named it Bing. In 1872 I planted some selected seed of a Black Tartarian cherry from which I raised a very fine late cherry in 1876. I picked them the eleventh of July and sent them to Philadelphia to the Centennial Exposition, and took the first premium on cherries at the World's fair. At the request of my friends, I named it Lewelling. It is a fine fruit, but the tree does not grow in good shape.

"In 1858 I received some rhubarb seeds from Long Island. I planted them, and from them raised one plant that has proved excellent; stalks, medium size, excellent flavor, and very tender. My friends named it Lewelling. In 1875 a gooseberry plant came up in a flower-pot, and the third year it bore very full of fine berries, about the size of the Champion, very good flavor, tender, and nice for cooking; we call it Lewelling's Seedling.

"In 1852 I received the first cultivated strawberry plant brought to this section—Hovey's Seedling. We nursed it with care and it grew nicely, but failed to produce any fruit. I sent for other varieties, but it took so long for them to reach us they died on the way. I finally received Wiatt's British Queen and planted them in alternate rows. I then succeeded in raising a few berries, the first I know of being raised in Oregon. Since that time I have occasionally sent for some new varieties, some of which are very good.

"In 1858 I sent to Long Island for the Lawton blackberry. Plants arrived safely and were nursed with care, and in 1859 I selected some good roots of the wild blackberry, and grafted two hundred of Lawton in the wild roots, out of which I only saved one. I cultivated this one to the best of my ability. It made one cane about six feet high, with seven shoots, from three to five feet long. In the spring of 1860 I set seven stakes around the main stem and tied up the main branches, and after the berries began to form I got a canvas large enough to cover the whole, so as to keep the sun from affecting them. Every time I picked any I weighed them, and set the amount down, and in this record it is shown that twenty-three pounds were picked from one single cane. I took off one cluster of twelve berries that measured, each, one and one half inches in diameter. I planted a small patch of blackberries in 1860, and cultivated them pretty well most of the time. They have produced a fair crop of berries every year since. I have tried several varieties of blackberries, viz.: The High Bush, Everbearing, White, Snyder, Kittatinny, and Lawton. With me the Lawton is, all things considered, the best berry to raise for profit. I have also tried the Wilson, and Wilson Junior, but they will not stand our winters."



From Mr. Albert Walling, who is one of the committee, I received the following:—

“The Major Francis, a seedling cherry originating with my father, G. W. Walling (another veteran fruit-grower), came into notice about twenty-five years ago at a horticultural meeting held in Portland, and was named after Major Francis, then a resident of the city, who took a great interest in horticultural matters—by a committee composed of Hon. A. J. Dufur, Chas. Molthorp, and W. S. Failing. It is a large, dark colored fruit, very fine flavored, and one of the best early cherries in the market for family use, but too tender for shipment. As the variety is so well known it is useless to further describe it. The Willamette cherry also originated with my father, and is a fine fruit for home use.”

The Champion prune, originating with Mr. Jesse Bullock, of Oswego, about 1876, is described as follows: Oblong in shape, large size, reddish-purple color, ripens from middle to last of August, keeping qualities good, and recommended by Mr. Hoskins and several other large growers as excellent for drying; tree thrifty, upright grower, and hardy. The Willamette prune originated with the same party, and is similar to the Champion, but darker in color and a larger fruit; also excellent for drying.

Mr. H. W. Prettyman, of Mt. Tabor, is the introducer of the Oregon cherry, in 1883, which has proven itself to be one of the very best cherries grown. It is large, dark colored, with mottled appearance, very attractive and of the best quality for eating, and its solid character makes it very valuable for shipping. Some specimens have measured three and one half inches in circumference. The tree is a vigorous grower, prolific bearer, hardy, and has been grown long enough to make it standard and worthy of general cultivation.

Mr. J. H. Lambert, of Milwaukie, has a seedling cherry, which he discovered on his place in 1888. It is one of the largest known. The color is dark rosewood and mottled; shape, long and pointed; quality, good; flesh, firm and will make a good shipper; tree, vigorous and upright. From the limited time it has been bearing, can hardly decide, but so far it is rather a shy bearer.

Mr. H. E. Dosch, of Portland, has a seedling prune of his own raising which was brought out in 1886, and called the Dosch prune; color, dark purple; size, larger than the Italian, but similar to that fruit in shape. Mr. Dosch writes that in the green state the fruit will keep for three weeks, and will dry twenty-four pounds to the bushel. Fine flavored, either green or dried.

Mr. J. H. Settlemier, of Woodburn, sends specimens of an apple originating with E. K. Hall, of Hales. It is of small size; color, red; season, from March to May. The above resembles the Romanite

so closely in looks and quality that it is difficult to tell the difference. Mr. Settlemier also writes that he has an early cherry, extra fine; ripening with Early Purple; same color as Governor Wood, but larger; very sweet but too tender for shipping; tree, heavy bearer.

Mr. Emile Schanno, of The Dalles, has a pear originating with him in 1888; shape, short and stumpy; color, like Winter Nellis, more russet; size, small; will keep till May, and not good to eat till February; tree, upright and will grow to the height of seventy feet; of French origin.

Mr. J. S. S. Powell, of Philomath, has four varieties of apples, one peach, and one gooseberry seedling, of his own raising. Three of the apples, numbers 1, 2 and 3, were raised from seed of Monmouth in 1874. Number 1 is similar in shape to the Bellefleur; good size; color, yellowish cast, red blush on one side; season, from March to June; tree, rank grower, heavy, straight body; wood, hard, not liable to break. Number 2, size smaller, with heavy depressions at both stem and bloom ends. Same in color as number 1; will keep till May. Number 3, about the same size as number 2; should judge about the same as Winesap; color, nearly all red, with yellow at stem end; will keep till May. Number 4, of which he sends specimen, resembles the Monmouth in shape, color and size, is a chance seedling; bore first crop in 1890; keeping qualities will have to be tested; the sample which I have is very firm and looks as though it would keep well. Peach raised in 1875; color, yellowish white; freestone. Gooseberry raised in 1880, larger than Champion and more oblong in shape; color, white. Mr. Powell mentions his success with Japan plums and other varieties, and shows a careful study of the fruit business.

Mr. J. Q. Young, of Cedar Mills, has several seedling cherries that bore first in 1889. He writes that they are equal to Royal Anne, which is saying a good deal. One he describes as nearly white and resembling Governor Wood. He also has a peach about half freestone; color, dark red; medium size; good quality.

Mr. Emile Berlin, of Corvallis, sends description of a pear from a chance tree that has been bearing for thirty years in above location. Size, larger than Bartlett; so regular in shape that they can be readily pared with apple parers. Color, greenish and golden-yellow, with dull red cheeks; season, same as Bartlett, but will keep till October; tree, a strong grower and branched so as to hold the heavy crops of fruit which it bears regularly every year. Fruit very seldom wormy; has small core and few seeds. Mr. Berlin writes that it is the best pear he ever saw; superior to the Bartlett for eating and canning, which gives it a good recommendation, and if it is as he describes it, is one of the best in cultivation.

## HORTICULTURE IN OREGON.

A paper read before the State Horticultural Society by ETHAN W. ALLEN.

To attempt to give in one address within the time allotted me anything like a complete history of the subject assigned me, is simply impossible, for while Oregon is in many respects comparatively a new State, yet in others she is an old one. Before the discovery of gold in California had turned the tide of immigration thitherward, the wonderful fertility of the Willamette Valley had been noised about in what was then the West—Illinois, Iowa, and Missouri. During the year 1847 several thousand souls were added to Oregon's population, as were also many valuable acquisitions to household comforts and farm productions.

One can hardly realize in these days of steam and electricity what it then meant to make a trip from Iowa to Oregon. Now it takes about three days in a palace car; then it took six months of weary plodding with ox teams. Among the heroic souls that came to Oregon in 1847 was Henderson Lewelling, who was a resident of Southwestern Iowa, and who conceived the idea of transporting to Oregon a nursery on wheels. This idea he proceeded to put into execution by making two boxes 12 inches deep, and just wide and long enough to fill the wagon-bed. These he filled with a composite of earth and charcoal, in which he planted several hundred trees and shrubs; these were protected from the stock by a light framework fastened to the wagon-bed. That load was doubtless, for many reasons, the most difficult one to manage that ever crossed the plains; and yet it has been truly said, "that load of trees contained health, wealth, and comfort for the old pioneers of Oregon," and it is doubtless true that *that* load of trees and shrubs brought more wealth to the State than any ship that ever entered the Columbia River. It was the mother of all our nurseries, and gave to Oregon a name and fame that she would never have had without it. These trees were planted at Milwaukie, six miles south of Portland, and the sale of fruit and grafts from them brought wealth to the enterprising planter. The great immigration to California, caused by the discovery of gold, created a market for every eatable, and the "big red apples" from Oregon were sold at enormous prices to miners and others.

Many orchards were set out by the pioneer emigrants, and some of the trees planted at that early period are still in vigorous bearing.

Fruit culture, especially the apple, proved very profitable, the limited products of those times selling at fancy prices.

Several persons made small fortunes from fruit raising, but few adopted it as an exclusive pursuit. The high prices then obtained gave a great impetus to the planting of orchards; but when these came into full bearing, the increase of supply brought prices down. California being the only market available, the supply very soon exceeded the demand, the result of which was that a general feeling of carelessness permeated the fruit-growers of Oregon, and but little attention was paid to taking proper care of the orchards or the enormous crops they produced. The fruit yield in the Willamette Valley alone has been estimated to average 1,000,300 bushels per annum.

Since the completion of the three transcontinental lines of railroads that now traverse her fertile valleys, bringing as it were the great fruit markets of the East to our very door, a new impetus has been given to fruit-growing, and the near future bids fair to see Oregon stand again at the head of the list as the greatest fruit-producing State in the Union.

It may be profitable for us to consider briefly some of the conditions that now affect us, and what is necessary to be done in order to accomplish this most desirable result. The work of the horticulturist can be traced back to a very early period in the history of the world, for we read in the eighth verse of the second chapter of Genesis, "And the Lord God planted a garden eastward in Eden, and there He put the man whom He had formed, with instruction to dress it and keep it"; therefore we see at this early day in the world's history was a partnership formed between God the Creator and man the creature, in that while God gave to man the orchard, yet the responsibility of its care and treatment, upon which was based its success, devolved upon man. The partnership thus formed at that early period in the world's history has never been dissolved, and today those who succeed in horticulture must comply with the requirements that were demanded of those to whom was entrusted the first orchard in Eden. When one looks over the products of the farm and orchard as grown in Oregon, one is led to believe that here doth combine—

The climate, the soil, and the elements, all  
To reward with full measure the husbandman's toil;  
And whispered it is, with semblance of truth,  
That the Garden of Eden, the place of man's birth,  
Where Adam and Eve, serpent, apple, and all,  
Brought mankind to sin, through their own wicked fall,  
Was located in this wonderful land,

Where are grown these products so grand,  
That one is led to exclaim, in the greatest of freedom,  
That no better could have been grown in the Garden of Eden;  
Such apples and peaches, such cherries and pear,  
Such wheat, oats, and barley were not excelled there.

And to live in this our Oregon is much better than to have lived in the garden of our forefathers; but it is well enough to understand that with the inhabitants of Oregon, as was the case with our first parents, rest great responsibilities; and while your future residence here may not depend upon whether you eat of the fruit of a certain tree or not, yet the success of your efforts in horticulture here does and will continue to depend upon obedience to those great laws of God, written in the volume of Nature, and to diligently study that volume is an essential qualification of the horticulturist. In the study of this volume of Nature, we find that she readily responds to the magic touch of the intelligent and painstaking husbandman. The condition of society in a savage or uneducated state is generally migratory; subsisting upon the natural products of the forest and stream, or at best upon the flocks and herds. As man increases in the knowledge of Nature's laws, he at once realizes that to be benefited by the productions of Nature, he must make use of those means that will enable these natural laws to exercise the full powers secreted within them. In accomplishment of this, man must not only use his hands, but his head also. When a boy upon the farm, I remember the trite saying of an old and most successful farmer, who lived close by, "that a little knowledge was better than hard work." This is as true on the farm as in all other avocations in life. The ground must be prepared with labor and the tree must be planted with intelligent care. Here is exercise for the body and food for the mind; thus the mind is expanded and the body strengthened. Hence the man is benefited, and society, of which he forms a part, is correspondingly improved. No labor that man can engage in tends more to civilize, educate, and ennoble mankind than does horticulture.

The highest types of civilization have ever been found connected with the highest attainment in horticulture. The highest type of this that has ever been produced was doubtless found in that Garden heretofore referred to, occupied by our first parents. All things went well with them until a pest got into the orchard; and while there seems to have been a liberal use of concentrated lye and sulphur, still the evil was accomplished, and the downward tendency of horticulture was inaugurated; and from that day until the present the orchardist has had to battle with this same orchard pest that was introduced in Eden, although not appearing in these

latter days in the form of a serpent, but in that of the Aphis, the Codlin Moth, the San José Scale, and a host of other pestiferous insects. One in view of this has written:—

“They come, the merry insect train,  
 The borers and the dippers;  
 The little gnats waltz in again,  
 And eke the gallinippers;  
 The vast colored ants, the flies  
 That titillate our features;  
 The bee, with penetrating ties,  
 And sundry sundried creatures;  
 The weevil and the cutworm now  
 Do polish up their armor;  
 The chinchbug makes his vernal bow  
 In ambush for the farmer;  
 The weird curculio setteth out  
 To mad the fruit tree tillers,  
 And in each garden lurk about  
 Ten billion caterpillars.”

Thus it is that those who dwell in this Garden of Eden of the nineteenth century—the valleys of Oregon—have been made to realize in these latter years that this army of pestiferous insects have found lodgment in our orchards through the subtle and oily tongue of the old man of Eden, in the form and garb of the tree-peddler, who, as the representative of some far away nursery, has beguiled some of our people with his gorgeous pictures into buying just a few of his extra choice varieties; and with these have come the pestiferous insects that now infest nearly if not every orchard in Oregon. This condition of affairs has brought the observant ones to realize that from this on, horticulture, if successful in Oregon as elsewhere, must be conducted on thorough business principles; and it may not be out of place on this occasion to briefly consider a few of the fundamental ones essential to success.

First of these is the preparation of the ground. The successful orchardist will realize that in this is the foundation upon which to a large extent the future of the orchard will depend.

If the ground to be planted has not a natural under drainage, it should be drained by the use of drain tiles. Wet, cold feet have doubtless been the cause of more failure in orchard planting in Oregon than all other causes combined. This is especially true of the prune and the peach. After the under drainage comes deep plowing, so that ample provision shall be made for plenty of good deep root growth. After the ground has been thoroughly prepared comes the planting. I shall not attempt to give any advice here relative

to the selections to be made in the way of kinds and varieties, only to say that one should study well the soil and location, and make such selections as will succeed best in the location selected. When this is determined upon, then buy the very best trees possible regardless of price. The cheap tree is most likely to be the dear one in the end. Good, thrifty, healthy trees with good roots and free from insect pests are the ones to buy, and no others should be planted under any circumstances. I desire to emphasize *free from insect pests*, for a tree infested with Woolly Aphis or San José Scale should be shunned as would be a horse with the glanders or cattle with the tuberculosis.

After the orchard is planted, look after it with the same care and attention that you would a prize herd of Jersey cattle, or a prize acre of potatoes. See that nothing comes in contact with the trees that will in any way mar or injure them. Give them thorough cultivation, and allow nothing to grow among them that will call for a division of the ground's nutriment. Keep the trees well pruned, and above all thoroughly cleansed from all insects destructive to tree or fruit. A first-class spray pump, a good plow, the latest improved cultivator, and a sharp pruning-knife, are as essential to success in fruit-growing as are the plow, seeder, harvester, mower, and thresher in successful farming. The man that would attempt to carry on one of the large farms in the Willamette Valley by the use of the wooden mold-board plow, the cradle, the scythe, and the flail, would be regarded as a relic of the almost forgotten past, and a fit subject for the asylum. Yet there are hundreds of men in this same Willamette Valley—and I doubt not some of you may have seen some of them—that are trying to make a success in horticulture by the use of principles and methods that are as obsolete as is the wooden mold-board plow.

The following from the Lamentations of the Prophet Joel, written eight hundred years before Christ, sounds as if it might apply to some of the horticulturists of the Willamette Valley: "Be ye ashamed, O ye husbandman; the vine is dried up and the fig tree languisheth, the pomegranate tree also, and the apple tree; even all the trees of the field are withered." It's barely possible that the horticulturist of that day had been treated to a combined dose of the San José Scale and the Woolly Aphis, as have some in our own valley. I sometimes think that it would perhaps be better for the agriculturist and horticulturist, if she had done less, so that those engaged in these, the grandest of all occupations, might not rest down so heavily upon her bounty.

The more study I give to the great natural advantages that this Oregon of ours possesses in the line of horticulture, the more I am

impressed with the greatness of her future. We may well feel proud of the immense wealth of minerals stored in her mountains, and to be hewn from her forests; but long after these shall have been exhausted, there will still remain a wealth of resources in her fertile soil and genial climate that will be as enduring as are the rugged mountains that form the backbone of her material structure. Horticulture in Oregon is but in its infancy; we are but feeling the first vibrations of a new life that is making itself felt in almost every hamlet within the State. The sound of the tree-planter is heard in the land. Wheat fields are being planted to orchards, and the woodman's ax is heard as it cuts away the natural tree growth that stands as a living witness to the fertility of the soil, to give place to other trees that shall not only testify to the fertility of the soil but to that combination of soil and climate that produces the very highest attainable results in fruit growth. At no far distant day will the traveler in passing from Portland to Ashland behold on either hand from mountain slope to mountain slope the fruit-laden trees that will rival those of the celebrated garden of the Hesperides.

The question is often asked, "Will not this fruit-growing be overdone?" and when asked of me, I call to my mind a trip I made to Florida in 1878 with the intention of investing in an orange orchard. Florida at that time was taking hold of orange culture about the same that Oregon is now taking hold of prune culture; there were croakers in Florida then as there are in Oregon today, and they were busily engaged then as now, in prophesying. They said, "The orange business would be overdone in a very few years, and that so many would be grown that no market, at any price, could be found for them." Being somewhat younger than I am now, and not so well posted in the worthlessness of their prognostications, I was influenced by them, and did not invest. Latter developments have shown that while Florida has increased by a thousand-fold her orange-producing capabilities, and to this has been added the enormous productions of California, still the markets have taken good care at good paying prices of all that has been grown, showing that the demand for that fruit at least has more than kept apace with the increasing supply. This has also proved true of the prune. The production of this most healthful and palatable fruit for the year 1890 in the United States was nearly if not quite double the amount produced in 1889, and yet the price was from 25% to 50% higher; and what is true of prunes is also true of nearly all other kinds of fruit. The facts are, that we are rapidly becoming more and more a fruit-eating people; and with our rapidly increasing population, and our comparatively limited fruit-



producing sections, we need have no fear of an over production, especially of good, first-class fruits, such as Oregon is capable of producing. This same question of supply and demand is not confined to fruit alone, but reaches all articles produced, whether grown or manufactured, and even to the professions as well.

Daniel Webster was once asked, "If he did not think there were too many young men studying law, and if there was not danger of the profession being overstocked?" The great statesman replied that, "It is getting a little crowded at the base, but that there is plenty of room at the top." So it is in all cases where there is an over supply; it is found in the poorer grades. There is always a good demand for the best, and in these is where the money is to be made. It is the lawyer that stands at the head of his profession that secures the big fee. So it is in every profession and calling in life; so it is in fruit-growing. Watch the markets of Portland, and you will soon see who it is that gets the topmost price for what he has to sell. It is not the man who gives no special attention to his orchard, either in the kinds and varieties, when planting his orchard, or in cultivating and pruning it, or in thinning the fruit, or in packing, seeing that no imperfect, diseased fruit is put in; but on the contrary, it is the man who makes it his business to see that these requirements for the highest attainable results in horticulture are complied with. It should be the ambition of every one engaged in horticulture to reach the topmost round in the ladder, and by thus doing establish not only a personal reputation but assist in establishing one for Oregon that shall be world wide. There is no excuse for any one to grow any but the best, where are found, as here, the most favorable conditions to be found anywhere.

I desire to say a few words right here to emphasize an important point in successful fruit-growing, and one that is being overlooked by many of our fruit-growers, and that is the proper time and way to market fruits. A man may possess all the qualities of a good orchardist in the growing, picking, and packing of his fruit, and still not be able to make his orchard pay. To illustrate: On February 10th, last, I received the following letter from a gentleman living less than thirty miles from Portland relative to his experience in growing and marketing fruits. He says: "Judging from my own experience here during the past two years, I am afraid there is a little or no encouragement to farmers and orchardists to spray their trees. I carefully sprayed my trees all last season, expecting to derive better market prices for my apples. To my surprise I only received from the Portland commission merchant 55 cents per bushel box of 50 pounds for large choice Baldwins, Northern Spy, and Spitzenberg, perfectly sound and free from

worms. The cost of spraying, boxing, freight, and commission came to 25 cents per box, which left me only 30 cents net. This is the same rate that I and others were getting here from the store-keepers for our inferior and worm-eaten fruit, delivered loose, that is, unboxed. No wonder then that the farmers will not take the trouble and expense to protect themselves against the Codlin Moth and the Woolly Aphis, or to select, box, and ship to market only sound and choice fruits. I have the largest apple and prune orchard in this district, and am much discouraged by finding such marketing results, after having taken so much care and gone to so much expense to protect the fruit against the ravages of these pests. It is the same with the dried apples. I find that it takes about 300 pounds of green fruit to make 50 pounds of dried, or 6 to 1. The price offered for choice machine evaporated and sulphur-bleached apples in rings is only 4 cents per pound in 50-pound boxes. You will see by this that one gets more for the unsound and undried apples by selling them green at 30 cents per bushel of 50 pounds than for the dried and boxed apples, with the costs thereto pertaining."

Now the facts are, the reason that this man is not making fruit-growing pay, is not that he does not give the proper care and attention to the cultivation of his orchard, or to the spraying of the trees, or to the proper picking or packing of his fruit, but simply to the one fact that, after he had done all this, he did not use the judgment of a schoolboy in marketing his fruit. He shipped his apples to a commission house that was new in the business, and who did not have the necessary business gumption to distinguish the difference between first-class winter apples and second and third-class fall apples, and at a time when the market was glutted with fall apples. The facts are that I and many more like me were paying \$1 per box for just such fruit as my correspondent was selling to the trade through a third-class commission house for 55 cents, and 90 days later, when I received his letter, and the proper time had arrived for marketing such fruit as he had, they were worth \$1.50 to \$1.75 per box, and what was true of his fresh fruit was also true of his dried.

I make use of this case as one of many that have come to my notice, to illustrate the truth that I desire to impress upon your minds, and that is, that it takes the same kind of good business sense to insure success in fruit-growing in all of its departments that it does in any mercantile business. We are making rapid strides in all departments of mechanics and trades; and if the farmer and orchardist is not going to be left behind in the race, they must make use of the same energy, enterprise, and intelligence that characterizes these.

To grow any other than the best is certainly a sin and should be made a crime. To assist in placing horticulture upon this high plane of excellence is the special province of the State Board of Horticulture.

It is possible, indeed probable, that the breaking down of the barriers of isolation, which until within a few years made Oregon practically a hemmed-in province, "pent up Utica," as it were, has resulted in introducing many disagreeable insects and bugs into our orchards, vineyards, gardens, and berry fields; but the fact should not be lost sight of, that long before the iron horse crossed the Cascades or the Siskiyou, the orchards of Oregon, the bountiful producers of our "big red apples," whose glory now seems like "a tale that was told," were, many of them, in a most dilapidated condition. How far the drop in the price of apples or most reprehensible shiftlessness is to be held responsible for this state of affairs, we need not inquire. So perceptible, however, was this condition of affairs ten years ago that a well-known writer, having traveled the entire length of the State, in discussing the future of the fruit industry, in a well-considered editorial, remarked: "The best move in the interest of orchardists of this State that could be made would be a general cutting down, digging up and destroying, root and branch, by fire, of the thousands of moss-covered, half-dead and wholly neglected apple, pear, peach, and plum trees to be found in Western Oregon." He was largely in the right; but these trees, breeding-places and nesting-houses of innumerable and constantly-multiplying pests, have neither been cut down, dug up, or consumed by fire.

In order to meet this condition, under the provisions of an act of the legislature the State Board of Horticulture was organized on the ninth of April, 1889, and it is to the work accomplished by the Board, to the bulletins and reports upon the number, nature, and destructive work of the insect pests that infest our orchards, the remedies to be used for their destruction, and the results already accomplished, that we must look for guidance in this emergency.

Let me, however, suggest to each and every citizen, irrespective of age, sex, or color, or previous condition of servitude, that it is his or her bounden duty to supplement the official action of the Board by close and intelligent observation of these pests, their habits, their works of evil, and the success or lack of success in the preventive and destructive measures adopted by them, and by careful recording of these observations and their submission to the Board, and so assist them in their arduous work. This is emphatically a case in which "in the multitude of counselors there is *benefit*, if not *safety*." There is good to be done, and everybody with an eye single to the

public good ought to bear a hand in summarizing the work of the State Board. The Board of Horticulture have devoted themselves assiduously to the important work before them; they have placed themselves in correspondence with head centers of information on the subjects with which they have to deal; they have solicited information on the topics engaging their attention from all available sources, and through General J. A. Varney, the State Inspector of Fruit Pests, they have endeavored to the best of their ability to acquaint themselves thoroughly with the real condition of affairs in the fruit-growing portions of the State. Much valuable information has thus been acquired, all of which has been widely disseminated through the columns of the newspapers of the State and by means of the bulletins of the Board, many thousands of which have been published and scattered broadcast through the mails and other channels of distribution available in this State and Washington.

The Board has good reason to believe that their work has met with the approval of fruit-growers, and has already accomplished valuable results. But, my friends, it will be in vain for the Inspector of Fruit Pests to expend time, money, labor, intelligent understanding of, and enthusiastic devotion to his duties; in vain for the Board to chronicle in their bulletins the names of these pests and the most approved methods of preventing their increase and destroying their capacity for reproduction, if their labors are not heartily seconded by the horticulturist. One diseased and neglected orchard, nay, one tree upon which these pests or any of them find an unmolested home, becomes a center from which radiates thousands of infected spores or winged messengers of disease and destruction. Let me urge you, then, one and all, to look into this matter as a concern of State pride apart from that of self-interest—the most powerful impelling motive after all.

The land once famous for "big red apples" ought not to be given over to the enemy. A general and hearty cooperation with the Board of Horticulture will result in such a change for the better that every man, woman, and child in the State will rejoice in the results. A neglect of the precautionary, preventive, and destructive measures recommended by the Board, reasonable in themselves and necessary under the circumstances, must lead to one of two things—abandonment of the business of fruit-growing in the State, or the enactment of sumptuary legislation, as has been the case in California and other States, which will doom whole orchards to destruction. The day is at hand when the fruit-grower must fight for his crop. He must protect his trees and fruits from the ravages of insects. These enemies of fruit and vegetation are yearly increas-

ing and the losses are growing alarmingly greater. The increasing devastation of insect pests to both fruit and tree are confirmed by the statistical reports from learned entomologists, horticulturists, and other authorities, and it has been proven that unless proper remedies and appliances are used at the proper time disastrous results will follow. To inform the horticulturists as to what are the proper remedies and appliances is a part, at least, of the duties of the State Board of Horticulture.

The result, after years of careful study, research, and experimenting, has been that spraying is a great success, both in destroying and preventing the ravages of insects and fungoid diseases. It is not sufficient, however, that the fruit-grower have a bulletin placed in his hand, with the necessary formula of what to use for the destruction of each family of insects, or blight fungus, but it is equally essential that he have a perfect apparatus with which to apply these remedies; for I am convinced after five years' work in this direction that the improper application of the remedies is the direct cause of nearly if not all of the failures reported, and which are usually thrown back at the Board with the assertion "that it don't pay to spray, because it don't do any good." A first-class pump, scientifically constructed, durable, easy to handle and operate, and economical in its use of the solution used, with a spray nozzle that will evenly distribute the liquids, not depositing a thick coating at one point and leaving the fruit or tree wholly exposed at another, are as essential as is the material to be used. Such there are in the market, and the first investment that a fruit-grower should make, after his orchard is planted, should be to possess himself of one of these; for the verdict is, in the "New Era in Fruit-Growing," that spraying at the right time, with the proper materials and in the proper manner, is the secret of success. The crowning glory of the early history of Oregon was the wonderful fruit that she produced. "The Big Red Apples" of Oregon made her famous in horticulture, and it belongs to her present residents to bring back to her the glory that formerly perched upon her banner, and upon the State Horticulture Society will devolve a large proportion of the work necessary to this result.

May it be the ambition of every member to do all possible things that shall aid in accomplishing this object so much desired.

## PEACH-GROWING IN OREGON.

By A. H. CARSON, of Grants Pass. Read at the January Meeting, 1892.

The principal peach belt of Oregon is confined to Jackson and Josephine counties, although there are a few localities throughout the entire State where peaches can be grown, and successfully, too, where the proper knowledge as to soil and varieties are understood and taken into consideration. With a good soil and the natural adaptability possessed by Southern Oregon for growing peaches, I find a great many unsuccessful peach-growers in that part of the State, and no doubt there are unsuccessful ones in other parts of the State with good locations. As I claim to have had success in peach-growing on the hill lands of Southern Oregon, I will attempt under the subject of this paper to give my method, in all of its details, as to the gathering and marketing of the crop.

I hold that the growing of choice, first-class peaches is a matter within the control of the grower. Hence his knowledge in the matter should extend to proper soil and location, how to prepare the soil, and plant his orchard varieties. To plant, care and cultivate, prune, gather and market the crop so as to get the best possible returns for his labor and capital invested, would all come under the head of "practical peach-growing." The question of soil is a material factor in the growth and success of the peach, and the following requisites should exist before planting an orchard of peach trees:—

First—Rolling hill land, that is, from 200 to 300 feet higher than the valley adjacent, with a depth of soil not less than eighteen inches, the greater the depth the better; thorough drainage—if not naturally drained should be drained by tiling. A soil that will produce a reasonable crop of corn in Southern Oregon, by good cultivation will grow good peaches. The object in choosing hill land for a peach orchard is, the altitude being greater than the valley, late spring frosts are not so liable to injure the crop as if planted on lower land. Then, such lands are usually naturally drained. The granite and red hill lands of Jackson and Josephine counties, where the depth of soil is sufficient, have proved by thorough cultivation fine peach lands. They are warm and generally of a loamy texture, and usually naturally drained.

The proper preparing of the soil for planting a peach orchard is another of the factors that contributes largely to the success of the peach-grower, and is one of the details that should have care and

attention. Many a failure in peach-growing in Southern Oregon can be traced to the neglect of the grower in not properly preparing the land for planting. I speak advisedly when I say I have tried various ways, and I have found but one way that is practical and warrants certain success in planting, and that is a thorough plowing of the soil to the depth of eighteen inches. Especially should this depth be had on all hill lands. This depth in plowing can only be obtained by using the subsoil plow after the turning plow. By breaking up the subsoil to the depth mentioned, you enable the soil to absorb more moisture during the dry season, by the circulation of the air through the soil to a greater depth, and you facilitate its drainage during the wet period, carrying the water through the soil in place of washing over the surface, thereby affording the soil an opportunity to absorb the gases that are in the water and store them up for the use and benefit of the young peach tree.

#### CARE IN PLANTING.

The soil being properly prepared, nothing will be lost to the grower by using care in planting. I have planted peach trees one rod apart, 160 trees to the acre, but I find there is nothing lost in planting a greater distance apart, eighteen feet each way; 137 trees to the acre I find gives the best results. This distance apart facilitates cultivation, and does not overburden the soil. I use one-year-old trees for planting—trees that are not too large, and am always certain that they have not been grown by irrigation, or on very high, moist soil. Such trees you will always find hardy and thoroughly ripe, and they stand the shock of transplanting better than larger and overgrown trees. With a sharp knife smooth off all parts of bruised roots, as a smooth cut will heal and callous more readily than a bruised one; dig the hole to receive the tree only large enough to hold the roots in their natural position; plant the same depth the tree stood in the nursery, working the fine surface soil carefully around the roots with the hands, tamping the same as firmly as possible, using care not to injure or bruise the roots. At the time of planting, I cut the trees back to twelve inches, so as to stock them at that height. I find in our section, that low-stocked trees are much healthier and thrifter than high-stocked ones; as the foliage shades the trunk of the tree, you avoid sun-scald and its sequel, gum, and a diseased bark, together with the inroads of the borer, and a possible loss of the tree.

In regard to varieties. This is a very important question to the planter to warrant success. There are a great many varieties of peaches in some localities, that succeed and do well, that are choice peaches. But all varieties should not be planted in Oregon. The

climatic peculiarities of extremes of heat and cold during every twenty-four hours of our spring months should be considered, and none but the hardiest, the iron-clad varieties should be planted—those varieties that are not affected by curl-leaf and mildew.

I have invariably had success with the Early Alexander, Brigg's Red May, Hale's Early, Early Crawford, Wheatland, Muir, Smock, and Salway. These varieties are not affected with the curl-leaf or the mildew to any great extent; while with the Late Crawford, Heath, Stump, Large Early York, Old Mixon Free, Ward's Late, and Chine's Cling I have lost the greater part of the crop each year from curl-leaf. Then it follows that we should only plant such varieties as are not affected by curl-leaf and mildew. Usually all varieties of peaches where the glands on the leaf are pronounced and well developed are hardier than those varieties that are without glands. When all the details of peach-growing are not attended to at their proper time, and careful, painstaking cultivation is neglected, failure is sure to follow.

I have seen so many failures for want of proper cultivation on our dry lands in Southern Oregon, that I am of the opinion many have but a vague idea of what proper cultivation consists of. Some wonder at their failure and attribute the cause to the soil or climate. You ask them about cultivation.

"Why, I plowed that orchard last spring; ain't that cultivation?"

Not by any means, I answer. Spring plowing is only preparing the ground for cultivation. The soil during the winter months absorbs a large amount of moisture. This moisture is vital to the success of the growing crop and should be retained in the soil for its use. When the rains in the spring cease, this moisture begins at once to be drawn from the soil by capillary attraction. To retain this moisture and reduce capillary attraction to the minimum should be the object of the intelligent horticulturist. This can only be done by careful cultivation. The soil should not be stirred too deep—three or four inches is deep enough—but it should be stirred often, at least once every ten days. Clods, if any, should be broken up.

Under a hot sun, capillary tubes soon form and the moisture is rapidly pumped from the soil by the action of the sun's rays. The harrow or cultivator run through the orchard often, cuts off and closes up these capillary tubes and evaporation from the soil ceases to a great extent. Then, by keeping the surface of the soil loose so that the air can circulate through it, the soil gets the benefit of the moisture precipitated by dews during our cool nights. It will be found by the orchardist that the cheapest and only practical mulch he can give a large orchard is thorough cultivation.



## PRUNING OF THE TREES.

We now come to the pruning of the peach. This is one of the questions that I have found the majority of peach-growers of Southern Oregon do not comprehend. I have often asked my neighbors during the pruning season why they prune their peach orchards, and usually their answer is because they see some one else pruning. Now, if the reason for pruning the peach is correctly understood, the vexed problem of how and why we prune a peach tree is easily solved.

The characteristics of the peach should be understood by all intelligent growers, to wit: That the annual growth of wood each year bears the fruit buds for the subsequent year's fruitage; that without an annual growth there can be no fruit the following year; that is one of the characteristic habits of the peach, to form more fruit buds than wood buds; that the terminal buds of a peach tree (or any other variety of tree) will quicken and grow faster during the season than axillary buds.

These facts being known, take an unpruned peach tree and note its growth each year. It will be found that each succeeding year the fruit is getting higher and higher on the tree; that the greater growth always is at or near the terminal buds; that each year's growth bears the fruit, while the intervening space back of each year's growth becomes bare of foliage, the wood buds perish and you have an unsightly tree, filled in with dead and dying branches that are consuming the remaining vitality of the tree, until it is only a question of eight or ten years when your peach tree is dead. To make the matter better understood, let me call your attention to a twig of a peach tree of the present year's growth. Let us examine it. You will find at the base of the twig several small, weak wood buds. At the terminal point of the twig you will find a prominent, strong wood bud with one or two axillary wood buds next to it. The intervening spaces of the twig you will find are nearly all single and double fruit buds, too many together for the twig to mature and ripen. Now, if the twig is shortened in half, that act serves a double purpose—it thins the fruit half, checks the natural tendency of the flow of sap to the terminal point and stimulates one or two of the weak buds at the base of the twig into growth to form new growth and fruit buds for the next year's crop. By pruning, you from year to year create young, healthy, vigorous wood; a constant renewal, so that a peach orchard at twenty years will look as vigorous and healthy as an orchard but three years old.

Therefore, if the reasons I have given why a peach tree should be pruned annually are correct, you who have neglected to prune can

verify the principle by putting it into practice by following the following rule in pruning the peach: If the weather is not freezing, prune during the months of February and first half of March. Cut out half of all the annual growth, keeping in view symmetrical proportion and an equal balance of the tree; then the remaining half shorten in half. You will then have pruned away three fourths of all the bearing wood. After the trees have bloomed and the fruit set, as large as marbles, you will yet find your tree is overburdened and should be hand-thinned to five inches apart. This may look like a great amount of labor, but it will pay you very large wages for doing it. I am aware it takes some fortitude to prune and hand-thin the peach. But it is practical, and the only way I know of that will insure the grower choice, large peaches that will command gilt-edged prices.

#### MARKETING THE FRUIT.

This brings us to the marketing of the fruit, and it is an important matter to the grower to get his fruit to market in the best possible condition.

Careful packing and honest grading is a detail which the shipper should always attend to. Invariably use clean, new, bright boxes. Don't send peaches to market in a dirty, inferior box. With honest commission men and a good demand you would be taxed by doing so. Then again, grade your peaches; let them be uniform in size and uniform in ripening. Always brand your packages with your name and shipping station; then, if your fruit merits it, the buyer will call for your brand again.

Never send a peach to market that will run over eighty to a twenty-pound box. The grower should be in a condition that, when the market is overstocked and weak, he should receive a reasonable price for his peaches, and this can only be done by being prepared to evaporate his crop when the prices for green fruit fall below a profitable figure.

The past year was a fruitful one for Southern Oregon, and a great many peaches from that section were shipped to market at a loss, and a great many choice peaches were left in the orchards to decay. Now, I claim that with the proper knowledge and management, every merchantable peach in Oregon would have brought the grower 3 cents per pound. My experience the past year has taught me that it is a matter with the grower whether he shall ship his green peaches to a glutted market at a loss, or keep them at home and evaporate them at a profit.

I found this year (1891) that while peaches were selling in the

Portland market for less than it cost to get them there, that I could evaporate my peaches at a good profit.

This is how I found evaporating a paying business. As a test, I had my men cut and place on trays 25 boxes of peaches, 20 pounds each; total, 500 pounds of green fruit unpared. I evaporated the same and found I had 75 pounds of the dried product, quoted at that time in the San Francisco market at 7 cents, which gave me \$5.25, less \$1.25 for labor, and I had net \$4 for 500 pounds of peaches. Not much profit in these 25 boxes, but better than a total loss.

The same day I had 25 boxes of peaches, 500 pounds of green fruit, pared (using a Scott's parer), and evaporated, when I found I had 106½ pounds of dried product, quoted in the same market at 16 cents per pound, which gave me \$17, less \$2 for labor, or \$15 for 25 boxes of green peaches; a gain of \$11 in favor of the pared over the unpared lot. (I will here add that two weeks ago I sold all of my pared peaches to merchants at home for 18 cents per pound. I yet have the unpared on hand.) The test I have given you carries with it its business moral: Pare your peaches to make them pay.

#### PARED VS. WHOLE.

No doubt to those who have not studied the question of evaporation, my results given may sound paradoxical, *i. e.*, 500 pounds of unpared peaches drying away to 75 pounds, and the 500-pound pared lot to 106½ pounds, a gain in favor of the pared lot of 31½ pounds. Nevertheless, the results I have given are correct, verified by repeated tests.

The reason pared peaches dry heavier than unpared, is this: It takes from 14 to 16 hours to dry unpared peaches in my evaporator with good circulation of hot air at 190° F. It only takes six hours at the same degree of temperature to dry pared peaches. With unpared fruit the moisture is all carried off through the cut surface. With the pared fruit evaporation is more rapid, as there is no paring to retard it. Consequently the albumen in the fruit coagulates more rapidly, and the glucose or fruit-sugar is retained in the fruit. Also the pectine, or fruit jelly, remains in the cells, or is left upon the surface by the more rapid evaporation of the water in which it was dissolved. Therefore, the retaining of the sugar and pectine, or fruit jelly, in the prepared peaches adds to their weight.

Through the longer time it takes to evaporate unpared peaches the albumen coagulates slowly, and the glucose or fruit-sugar and pectine passes off, and is lost to the fruit, not only a loss in weight, but a loss in quality. Allow me, before I close this paper, to

recapitulate. It is a question within the control of the peach-growers of Oregon, whether you will or will not have a reasonable price for the products of your peach orchards. By being prepared to evaporate the products of your orchards, when the prices are too low to justify shipping the fruit green, enables you to reach distant markets and paying prices. You are not then the victims of an overloaded market—your fruit is in a condition that you can hold it until the demand warrants you a fair reasonable price for it. When we have obtained a reasonable price for the products of our orchards, and give the buyer value received, we have attained "Practical Peach Growing."

#### DISCUSSION.

The reading of the paper was followed by a multitude of questions which drew out of Mr. Carson a great deal of valuable information in addition to that contained in his paper. He stated that there is a peach orchard in Grant County which is 35 years old, and the trees are still vigorous as a result of constant pruning. Upon the subject of drying or evaporating fruit many questions were asked and answered. Mr. Carson thoroughly explained the great importance of a thorough circulation of air through the dryer. With perfect circulation the temperature of the dryer can be run up to 190°, or even 220°, but with poor circulation the fruit will be scorched at a temperature of 150°. The faster the fruit is dried the better the result both as to quality and appearance. Silver Prunes dried with thorough circulation are as light colored as the samples from California supposed to be bleached. In Mr. Carson's dryer he cures Silver Prunes in 24 hours; French or Petites in 18 hours; Italians take a little longer than Petites.

Mr. Carson described in detail his dryer, which is very simple and effective in construction, and provides for a very complete and rapid circulation of air through the drying fruit. He stated that a man at Ashland dried fruit in a marvelously short time by using a blowing machine to force a rapid current of air through his dryer.

For peeling his peaches Mr. Carson uses the Scott peach parers, which retail at from \$2.50 to \$4 each. He bought direct from the manufacturer at \$10.50 per dozen.

The more rampant the growth of the peach tree the better the quality of fruit would be the next year, if the trees were properly pruned. Peach trees should not be pruned during the growing season. The leaves are the lungs of the trees, and every leaf removed prematurely from a tree takes so much of the vitality from the tree. He would follow the advice of Patrick Barry and prune in February. It might be possible that on strong alluvial soil the

growth would be so rampant that some pruning would be necessary in June in order to induce the production of fruit buds.

Mr. Carson told the result of spraying fifty apple trees ten years old. Year before last they were not sprayed, and less than 25 per cent of the apples were sound. Last year he sprayed them seven times—the first spraying being done May 20th, and the last about September 5th. For spraying he used a cheap pump and one half of a teaspoonful of Paris green to five gallons of water. He only used 25 cents' worth of Paris green during the entire season. When the apples were picked they counted out ten different lots of one hundred apples each from different parts of the orchard and carefully examined them. Only  $3\frac{1}{2}$  per cent were wormy.

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## ORCHARD PLANTING.

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Read before the Society at Newberg by MILLARD O. LOWNSDALE, of Lafayette, Yamhill County.

"I have not had sufficient time at my disposal, since receiving the suggestion that I prepare a paper on orchard planting, to write much that would be of interest or profit to the Society, and have only been able to collect some random notes of my experience in the line suggested. I shall advance few theories and court no following of methods, simply reciting the modes employed on my farm. I have found that the planting of a commercial orchard furnishes an experience *sui generis*. Theoretically the same methods obtain in handling 20 or 20,000 trees. Practically there is so great a difference that the commercial planter must unlearn much; and, abandoning beaten paths, must improvise many methods on the spur of the moment. During the past year I have planted to fruit trees about 265 acres of my farm, the principal acreage of which planting is in winter apples. The selection of a site for my orchard was made after much deliberation and balancing of the merits of many localities. High land was demanded first of all; then the soil must be naturally well drained. All high or hill lands are by no means naturally drained. A rich, loamy soil, deep and naturally porous, which with good drainage is always a warm soil, was also required. A western slope was preferred as furnishing a partial escape from the morning sun in times of late spring frosts. These qualities, together with natural wind-breaks and perfect atmospheric drainage, would go far to make up the elements of a favorable situation for an orchard, and are fairly descriptive of the land I selected for my commercial venture.

My soil is of two characters—the ordinary loam, speaking vaguely, of the Yamhill Valley, and the mellow ferruginous soil of the red hills. I began by plowing deeply in the valley ground and subsoiling to a depth of 19 inches, thus loosening the ground deeper than man had ever disturbed it. This method was employed on the hill land wherever necessary. Fortunately the loose, friable texture of the greater portion of my upland renders such deep stirring unnecessary. But everywhere an average depth of 12 inches was obtained by the use of heavy plows. The thorough and deep plowing and harrowing of nearly 300 acres of land in the autumn season is in itself a work of no small magnitude and furnishes an excellent school for the development of energy. It was impossible to prepare such an acreage and set the trees in the fall, or even in the early winter, so my tree-planting was necessarily deferred until spring, a plan which has little to recommend it. When it came to laying off the ground for my trees, I found that it was impossible to set stakes by any of the methods employed in small plantings. On uneven or hilly ground it is absolutely necessary that a surveyor set every stake, if one is at all finical about the appearance of his orchard. This one item was taught me at a considerable expense in money and the loss of three weeks of the most valuable planting time in the early spring. But by a later expenditure of about \$400 for surveyors' tolls, I now have an orchard whose mathematical contour will be a life-long pride and satisfaction.

“My trees, consisting of 10,000 peach trees, and about 15,000 apple, were purchased by the Secretary of the State Board of Horticulture, with the kind assistance of the then State Inspector of Fruit Pests. The peach trees were principally Early Crawfords. I planted, however, 1,000 Charlottes in dormant bud, which, by the way, are very thrifty and satisfactory trees. The apples are of four varieties—Gravenstein, Baldwin, Spitzenberg, and Northern Spy. These varieties were selected after careful investigation into their adaptability to the neighborhood. In many localities throughout the State the Baldwin is a failure because of bitter-rot. This fungus can be controlled by the ammoniacal copper carbonate solutions if properly applied, and by its use this variety of apples can be kept in prime condition until April or May.

“The peaches and the greater part of the apples were yearling trees, but, as it seemed impossible to procure the requisite number of healthy yearling apples of the desired varieties, a small proportion of two-year-olds were planted. Upon arrival at my place, and before they were heeled in, all the apple trees were dipped, root and branch, in a disinfecting solution of one pound each of concentrated lye and whale oil soap to 15 gallons of water. I am not certain that this

proceeding was necessary, but I do know that at present the trees are all healthy and free from pests of every kind. The peach trees were heeled in the fall without dipping, but they all had their bath before planting in the spring. For this dipping I used a 10-gallon solution and did not immerse the roots.

"I received a lot of 4,000 trees from a well known Washington nurseryman. I saw these trees standing in the nursery and was much pleased with their general appearance, as they were stocky and apparently thrifty. Contrary to my emphatic orders, the nurseryman dug the trees while they were yet unripe and in leaf, and packed them in tight boxes. When they arrived at my place about half of them were cooked, having heated in the boxes, and at least 500 of them were already dead. Out of the 4,000, I think there were about 200 sound trees, the remainder having been injured more or less. My foreman had heeled in the lot before I saw them. But when we came to plant in the spring I found a queer state of affairs. There was a great jumble of seedlings, two-year-old and three-year-old trees, apparently the offal of a nursery, thrown in, as I was afterwards assured by the nurseryman, to 'make up count.' The trees supposed to be yearlings were in reality two-year-olds, which had apparently been left unsold at yearlings and had been transplanted. They had been thrown into a trench, no care having been taken in the disposition of the roots, which were a deformed and almost solid bulk, with few or no fibres of the current year. The trees had been cut back to a bud, flooded by a neighboring river, and allowed to send up a sappy watershoot, handsome in appearance, but possessing not one element of lasting vigor. The roots were in such condition that it would be a miracle if the trees withstood the shock of transplanting to drier ground. These trees were bought and paid for as first-class in every respect, and the circumstances were such that I could not know of the conditions under which they were grown. When I saw their defects it was too late to remedy the matter for the season's planting, and I wrote the nurseryman that I would plant the trees and as many as recovered and grew would be accepted, but that the remainder must be replaced. But what reliance could I put upon trees from such a dealer? And so when at least two thirds of the lot of 4,000 failed to start this year I determined to receive no trees in lieu from the peculiarly honorable gentleman.

"My 25,000 trees were planted in 18 days with a gang of nine planters. Holes were dug about three feet in diameter and the ground pulverized to a depth of from 20 to 24 inches. The trees were set about three inches deeper than they had stood in the nursery, and the earth was well worked in and about the roots with

the fingers. There is no implement made that will take the place of the fingers in the planting of a tree.

"The reason for planting so much deeper than the indicated growth in the nursery row was that the peculiar loose condition of the soil would not admit of shallow root-growth. The tender rootlets of the first year's growth would be more liable to die of thirst than if compelled to seek their sustenance deeper. Then, too, this deeper planting forstalls possible wind storms during the first years of the orchard's life, and tends to prevent the bodily lifting of the tree from its bed, an event possible at any moment in my mellow soil.

"My apple trees are planted 24 feet apart, and the peaches 18 feet. Fruit trees in our neighborhood do not riot in the wood-growth found in California, or even in the Eastern States, and a peach tree that would wanton over 24 feet of California ground would be well content with 18 feet of our soil. I imagine this to be no misfortune to the tree, because a luxuriant growth of wood drinks up many of the essences that should enter into the composition of the fruit, and soils that produce such vigorous wood-growth are often lacking in the ingredients that form good fruit. A well followed system of cutting back will keep all peach trees in Western Oregon within the bounds of 18 feet, and apple trees should be well contented in 24 feet. The system of pruning in use in my orchard is to shape the trees to the modified vase form, which is to be seen so generally in the orchards of California. To that end my peach trees were cut back at planting to a uniform height of 20 inches, and my apple trees to 24 inches. The three or four branches allowed to grow will form a head, which, if rightly handled, will support future crops to the very best advantage, for the weight will be borne almost vertically.

"In detail, my plan is to commence with the yearling tree at planting, cutting back to the desired height and allowing, say three main branches to form, rubbing off all other buds or pinching their terminals after they have grown a few inches. Cut back the second winter, leaving a growth of about 12 inches, and permit each of these three shoots to send out two branches the next summer, pinching off all others. I will then have six branches to my tree. At the third pruning these six branches will be cut back to about 20 inches, and the next summer there will be twelve branches as a head, and the tree will have assumed the vase form so much admired in California orchards, and will be symmetrical and able to carry a great load of fruit well over the center of gravity. Care should be taken at the third pruning of peach trees, especially, to leave short laterals along the main branches to bear the first crop of fruit.



"This method of tree handling is often varied in California by pinching, in the early summer, the terminals of the main branches, thus throwing the growth into the laterals the same season. I have pruned a number of my trees in this way, and find they are a year ahead of those which grew their branches untouched. But this must be done in the early summer, for the late growth is uncertain and unsatisfactory. Judgment should be exercised to adapt all pruning to the different habits of tree growth. For instance, the Gravenstein and Spitzenberg being of opposite habits of growth, would require different treatment. The Spitzenberg, an upright grower, should be cut to an outside bud, while the Gravenstein should have the disposition to stretch its elbows far out controlled by being trimmed to an inside or upright bud.

"Many times the lower buds on the trees are destroyed by careless handling, or by the omniscient nurseryman, or some buds will fail to start, and the tree will have a poorly balanced head. This can be remedied in the apple tree at least by inserting a bud where the branch is desired. I was compelled to do this in a number of instances, and have had growths of seven or eight feet from buds inserted this spring.

"I was greatly troubled by digger squirrels this spring, and though I waged war against them unceasingly, they destroyed many of my trees. In June, I applied a wash to my peach trees as a preventive of borers, painting the trunk from the roots to the lower branches. I found that the squirrels let these trees severely alone, and I shall apply the wash to all my trees next spring as a squirrel charmer as well as for the general benefit of the tree. The wash is as follows: Whale oil soap, five pounds; concentrated lye, three pounds; resin, five pounds; sufficient slacked lime to make 15 gallons. Boil the whale oil soap and lye in about four gallons of water; add slowly the resin, melted, stirring well. Mix with these ingredients enough slacked lime to make 15 gallons. Apply with a brush. The original recipe was sent me by a peach-growing friend in Delaware, and contained a pint of gas-tar to the pound of whale oil soap, etc. I was afraid of the gas-tar, and didn't use it, though doubtless in this combination it would have done no harm, besides being a protection against borers and squirrels, this wash will serve as a preventive of sun scald, and by its application next year I will do away with the many thousand boards I have used as sunshields.

"While all these operations of orchard planting are intensely practical, yet every detail is full of sentiment. The affection a man has for a vigorous, healthy tree, and the desire to see it carried along in its thrifty growth, lend to orchard planting, even with its

multitudinous cares, almost the witchery of love. The shaping up of 10,000 trees, each individual with its idiosyncrasies, yet all apparently cast in the same mould; the wrestling with a stubborn soil until it shows satisfactory tilth; the showing of a sturdy front to the battalions of invading pests; these, and a thousand other studies, will furnish abundant employment for the brain and sinew of the commercial planter. He will seldom have an hour for recreation, no post-prandial siesta; often he must hear the lark trilling afield at the flush of dawn. Little time will there be for going fishing or for anything but the forming of a multitude of plans, whose ill-execution will suggest a very lexicon of hard words, and many a night's unrest withal will be debited to the tree-planting account. But the care and devotion lavished on tenderlings, the nervous fears of the stroke of vernal frosts, or of the amorous kiss of the summer sun; the fondling touch at every passing of a promising tree; the rosy dreams by night and day of prolific fruitages; these are all the chapters of an ecstatic romance, aye more, they are the very elements of the apotheosis of orchard planting."

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## THE APPLE AND ITS CULTURE.

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Read at the October, 1891, meeting at Dallas, by E. H. SKINNER, of Newberg.

Allow me to state in the outset, that being more of a practical man than a scholar, I shall give a practical view of the subject, combining with it largely my own experience.

Very little of the early history of the apple is known; at the present time even the origin is unknown. Mention being made of it in the Bible, it is supposed to be a native of Palestine, yet in Canaan and surrounding countries it is worthless as a fruit at the present day. Egypt and Palestine import their apples from Damascus. Pliny speaks of the crab as a "wildling," having had many a foul curse given it on account of its sourness. It is therefore supposed that the apple of Scripture times must have been fruit different from ours, as it is spoken of in connection with other choice fruits, and must have possessed good qualities of itself. The parent of all our apples is probably the wild crab of Europe. There can be but little doubt that all our good varieties had their origin in the apples of the mother country; at least our first mother, if history be true, seems too have had too much to do with them. Pliny states that twenty-two varieties were known to the Romans. We are blessed with a very much larger number. The

American crab apple is a sweet scented fruit, about an inch in diameter, translucent, fragrant, and of a yellowish green color. Its blossoms, appearing early in May, are large and rose colored. The tree is about twenty feet high, and is a native from Western New York to Wisconsin, and in a southerly direction. Other varieties of the crab are natural to the Middle States, but our valuable kinds do not spring from these.\*

The apple tree is a hardy, slow growing tree; has an irregular head, rigid branches, roughish, hard, broad, strong, green leaves of firm texture, and a close, hard, fine grained wood. The tree is long lived, there being fine specimens of it in this country now bearing fruit at 150 to 200 years old. I visited a tree near Castleton, New York, which bore over 100 bushels of apples in one season, and the tree was over 100 years old at the time. Downing speaks of this tree in his "Fruits of America." I went hundreds of miles to see it, and was astonished at the sight. The apple tree thrives best in limestone soils and deep loams, especially where such soils are found on ridges or upon high table lands. It succeeds well on all soils not wet, except those of a peaty or purely sandy nature. The apple is more universally grown, and I may say more generally known, than any other fruit. It is carried to a higher perfection in our own country than in any other. The fruit in this country is so superior that it is said that in Covent Garden market, London, it commands almost fabulous prices. How highly it is appreciated in this country may be seen from the orchard products of the United States, which are almost astounding in their magnitude. It being granted that the apple is the most important fruit, and the importance of its culture unsurpassed, it will be my object to give some hints for its more successful cultivation in this great Northwest. We have been through the times of youthful experimenting in fruit-growing and learned by many a sad loss that there are varieties that it does not pay to grow. Nearly all plant too many varieties. Do not set more than three, and large blocks of each variety, so that you can fill a car at a shipment of each kind in its season. Plant young trees, never over two years old. I prefer good, strong trees of one year's growth. Don't plant poor trees because they come cheap; they are dear at any price. Cut back to three feet at time of planting. Allow but three side branches to form the first season besides a central leader. The second season shorten the leader or central shoot back one third of its growth, and the three laterals or side branches to one foot; this will cause them to branch, which is better than to have too many limbs come out of

\* The native crab of the Pacific Northwest is *Pyrus rivularis*, widely different from the Eastern wild apple.

the body or trunk of the tree. The limbs will be stronger and better able to bear up under their load of fruit. The third season cut out all branches as they appear nearer than one foot above the first set of limbs and shorten again the laterals about one third. After this you will have but little trouble, as you have learned what method to follow to keep your trees in good form. DON'T PLANT ONE TREE MORE THAN YOU WILL TAKE GOOD CARE OF. NEVER SOW TO GRAIN OR GRASS. Cultivate every year until first of August, then stop to allow your trees to harden up for winter. Now you can look over your long rows of beautiful trees with pleasure, and with the assurance of ample returns. I have emphasized the care and cultivation, there is so great need of reform in this respect. Horticulture ought to be reduced to a science, and not be a mere series of uncertain and blundering experiments. What is the duty of those who see the defects? It is plainly to show to those engaged in this employment what his higher success demands.

The longer I live and the more experience I have in this business the more I am impressed with the absolute necessity for a portion of our young men to learn the trade of cultivating fruit for their occupation. I would not say that no one ought to try to raise fruit until he has learned the trade, for every farmer should raise his own fruit of all kinds, though he cannot succeed as well as the professional fruit-grower; but I do say, many more could be profitably employed in raising good fruit.

Our Eastern fruit-growers are exporting apples to England, and we can substitute our own fruit for the large quantity now imported in various forms. Besides, our own markets are not half supplied. The consumption of fruit will increase as the supply is increased. More fruit will be better for our health. Dispense with whisky, beer, and tobacco and use fruit instead. It will be a great national blessing. And then there is a good moral influence in bringing up a family of children on a fruit farm, which is a better legacy for the sons and daughters than all other property. I plead for a higher education of farmers. I have not only the greatest possible respect for their calling, but a strong personal attraction to it. I was brought up on a farm; have always had farmers for my neighbors and friends; am fully half a farmer myself, by right of both birth and experience. I know the hard facts of a farmer's life, and I equally know its pleasant possibilities; and nowhere in America have we greater hope for success than here in this beautiful North Pacific Coast; no hard winters to kill our trees; no spring frosts to destroy the young fruit; in fact, every variety is inclined to over-productiveness. I would like to give some of the advantages of

thinning, but I will leave it for another time, as I have already exhausted your patience.

## A FEW NOTES ON PRUNING.

Read at the Dallas meeting of the Oregon State Horticultural Society by A. H. DODD.

The object of pruning is: First, to shape the tree; second, to admit the life-giving sunlight among the branches; and third, to check the growth of non-bearing and stimulate the growth of bearing wood.

In regard to the first object to be attained, the time to shape a tree is while it is young; for, "As the twig is bent, the tree is inclined." A Catholic priest once said: "Give me the entire training of a child's mind till it is six years old and I will risk your ever making much change in its religious convictions afterward." Trees are much like children, and men are but children of a larger growth. If the right care is bestowed on them the first three or four years of their growth, there is seldom any need of the "wood-butcherer" style of trimming in after years.

Now, my ideal of the form of a fruit tree is a trunk smooth, straight, and vertical, four feet from surface of ground to first branches, and top of the tree the shape of an egg, small end up. Of course, it is not always possible to have the tree this shape, some trees being of upright growth, others of side branching habits. The graft properly set on the root by the nurseryman, should, under ordinarily favorable conditions of growth (I speak now of the growth of fruit stock in this part of the country), attain an upright, whip-like growth of from three to five feet the first season. Now, if the top of this whip is cut off and all the buds pinched off except the four highest, this will force the growth to them the next season, thus sending out what in after years will be the main branches of the tree. I would not branch a tree higher than three or four feet above the ground; first, because the low top will tend to protect the trunk and main branches from danger of sun scalding; and second, because we do not want too long a distance for the sap to travel from the root to where we desire to form the fruit-bearing wood. Having thus begun the shaping of the tree, our next object should be to encourage the growth of branches in such directions as to have the tree as evenly balanced as possible, and then send the growth upward; for in orchards, as in business circles, "There is plenty of room at the top," and the weight of fruit borne will tend to bend the branches down plenty fast enough.

When a tree is thus cared for at the beginning of its growth, a very little attention to it each season, pinching off buds and new growth where no branches are desired, will be sufficient to preserve it in good shape, without resorting to cutting or sawing off large limbs, except in case of repairing damage by the breaking of large branches by storm or accident.

As to time of year for pruning, any time will do after the sap is thoroughly "down," as it is termed, in the fall, and before it has started in the spring; but I would advise spring pruning, for then little time will elapse before the new growth will tend to heal over the cuts. Where old trees are to be trimmed to renew their growth, it is safer to smear their wounds, caused by cutting large branches, with paint, to prevent rotting of the wood by exposure to the weather.

As to the second object of pruning: Probably most of you have noticed the inferiority of size, color, and flavor of apples grown in the shade in a thickly brushed tree, compared with those grown in the full sunlight on a tree with the superfluous brush trimmed out; and the same holds true of other fruits. Science has clearly shown that all life and vigor in both the animal and vegetable kingdoms comes directly or indirectly from the influence of the heat and light of the sun. Notice a plant grown in a dimly lighted cellar; although the heat, air, moisture, and soil may all be most favorable to its growth, yet what a sickly growth it makes without the sunlight. We never need anything brighter than the glorious sunlight of Oregon summer weather. So let us not deprive our fruits of basking in it by leaving too much brush on our tree tops.

On the third object of pruning but little can be said in a paper of this kind. Observations and experience among one's own trees are by far the best teachers, but the general rule is that root and top must be in proportion. As in transplanting more or less of the roots are cut or broken, I would cut back the top to correspond. When the tree is well rooted in its permanent location, it is well to take a little notice each season of the new growth of twigs and branches, as they are to form the fruit-bearing buds the following season. The general tendency of fruit trees in Western Oregon seems to be to form too much top. If too much growth has been made in a season, it can hardly be expected to ripen its wood, and have the health and vigor to bear the most perfect fruit. In such cases it would be much better to sacrifice a part of it by cutting away the poorest and most ill-shaped twigs, and the better quality of fruit borne on what remains will more than compensate for what might have come on the twigs taken off.

What I have said has been in reference to fruit trees, but my plan of pruning would vary but slightly in the case of small fruits. In starting a grape vine, I would cut back the first season's growth to two buds, and all the next season's growth to three or four buds; and after that, each season, in the latter part of summer, I would clip the ends of new vines to cause the new growth to ripen and harden as much as possible before the setting in of winter. In the case of currants, berry vines, etc., I should merely keep them thinned by cutting out the oldest canes, and cutting back the new ones to cause them to branch and ripen for their work of fruit-bearing the following season.

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## SUCCESS VS. FAILURE.

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A paper read by R. D. ALLEN, of Silverton, at the October meeting, 1891.

The wonderful strides Oregon has taken the past year in the matter of orchard planting would indicate that there is great confidence among our people as to the adaptability of our soil and climate to the production of the various kinds of deciduous fruits, and that a market will be found for them at more remunerative prices than for any other farm product. While some have, doubtless, thought that an orchard would make them rich in a few years with little effort further than the planting of the trees, it is gratifying to note that a majority of those who are engaged in starting new orchards have fully considered the requirements for success and are availing themselves of every means within their reach to learn "the trade," as fruit-growing is indeed a trade.

Those who are starting right and take the proper interest and adopt methods pursued by successful growers will undoubtedly succeed, while he who plants carelessly and slovenly and neglects judicious pruning from the start, or trusts everything to an indifferent hired man, will simply fall by the wayside, and will probably cry out to those who have distanced him in the race that luck is against him. His neighbor selected trees judiciously, plowed his ground ten inches deep (or deeper) to receive them, thoroughly drained his land, cut his trees down to the proper height before the buds opened, planted carefully with careful hands at the proper time, kept his orchard well cultivated so as to keep down all weeds and secure abundant moisture, watched for borers and other injurious insects, protected the bodies of his trees against possible injury from freezing during the winter, and in a few years had a fine bear-

ing orchard to pay him for his trouble. The careless man neglected these important details, and attributed his failure to ill luck.

After all that has been said and read at our horticultural meetings pertaining to the proper manner of planting and subsequent treatment of orchards by practiced growers, and despite the fact that much valuable information relative thereto has been compiled, published, and distributed throughout the State by the various horticultural societies, it is not uncommon to see would-be fruit-growers ignoring every known requirement for successful orcharding. Here is a man who has been reading real estate literature on the profits of fruit-growing in Oregon, and has concluded to abandon wheat farming and try orcharding. He starts in with about 15 acres, buys the largest trees he can get, cares nothing for the roots, but insists on extra large tops, sets his men to plowing up an old run-down wheat field, which probably has been plowed 30 times in as many years, and in all probability never more than six inches deep, at which depth there has been formed a very firm hardpan which he does not think worth while to disturb. When he begins planting his aim is to get as many planted in a day as possible. Two men will probably plant 200 or 300 per day, while 100 properly planted is a good day's work for two men. He neglects cutting back till the following spring (if he has been wise enough to plant in the fall), and, ten chances to one, waits until the trees are in full leaf; neglects plowing until he gets ashamed of the weeds, and possibly he will harrow two or three times through the summer. The next fall his orchard looks sick, and he will probably caution all his neighbors against buying any trees of the nurserymen who supplied him; or, perhaps, his trees become infected with orchard pests, and he attributes his failure to get a good orchard to these, forgetting that his slovenly treatment invited the pests. Here is another man who has planted his young orchard to grain, thinking to raise such crops while the trees grow, and thus kill two birds with one stone, not realizing that one of them is the bird that lays the golden egg.

There are a few of this class of fruit growers in every community, who, if not successful themselves, serve to warn their neighbors that success does not attend those who follow their methods, and to this extent, at least, are a benefit to the community. But, as before stated, the majority of the fruit growers in Oregon do not belong to this class. They have learned by observation and experience that adaptability to the calling and intelligently directed effort are the requisites for success. The best authorities are consulted and when practicable followed, realizing, however, that methods best adapted to one section of the country are not necessarily the best for another.



They are observing that fruit trees of all ages are dying, more or less, and are inquiring into the cause with a view to preventing further loss therefrom. Societies are being organized and these matters brought up and discussed by practical workers. They are realizing, in fact, that successful fruit-growing requires intelligence of the higher order, and we predict that an era of horticultural progress is dawning that will develop a class of farmers of whom it cannot be said, "Their farms are a refuge for the incompetent."

## OUR CONIFERS ECONOMICALLY CONSIDERED.

Read at the July meeting, Oregon State Horticultural Society, by DR. J. R. CARDWELL.

Oregon has her snow-capped peaks, deep cañons, far extending glacial fields, magnificent water-falls, Coast, Cascade, and Blue Mountain ranges of wildest and ever-varying scenery; the far-reaching, undulating plains of Eastern Oregon; the rich, broad, and incomparably beautiful valleys of the Willamette, Umpqua, and Rogue Rivers; the lordly Columbia—the second river on the Continent—with a wealth of scenic grandeur along its banks that has to the traveler rendered the famed Hudson tame and spiritless; the Klamath Lake country reaches to the horizon in one level plain of luxuriant, perennial grasses; Crater Lake and surrounding National Park are destined to be wonders of the world; and there is much more that is grand, beautiful, and impressive in Oregon scenery, yet no one feature of our State can claim more, nor is destined to attract more attention or do so much for our material prosperity and pecuniary gain as its phenomenal forest of giant evergreens, cone-bearing trees. Of these, their vast extent, individual characteristics, and commercial value little is known to the outside world.

That great equatorial current, Kuro Siwo—Japan current—circling and surging along our coast, giving off a warm, moisture-laden air which, rising into our mountains and passing over our valleys, is constantly precipitated in an invisible form in dews and our annual rainfall. The deep volcanic mountain soil, rich alluvial valleys, and mild, equable climate in which the evergreen grows almost the twelve months in the year, have conspired to develop in Oregon and Washington the grandest and most extensive as well as the most valuable forests on the continent.

Of the thirteen genera of the order *Coniferæ* in Oregon, thirty-five species have been discovered and named, all of which are new and only found on the Pacific slope.

We have no evergreen trees in Oregon found in the Eastern States or elsewhere with possibly the exception of one variety, *Juniperus communis*, common juniper of Eastern Oregon, about which botanists differ. All other varieties are definitely new. Of the leading families we have ten pines, five firs, two spruces, one larch, two cedars, two chamæcyparis, one arbor vitæ, one cypress, and four junipers. The most notable of which I wish to speak specially is a new genus, a new species, a new variety, single and alone, botanically known as *Pseudotsuga Douglasi*, as the name indicates, false spruce of Douglass, discovered by a very able and enterprising Scotch botanist, David Douglass, who explored and botanized our forests in 1823. This tree called by us a fir—not a fir; called by some a spruce—not a spruce; extensively known commercially as Oregon pine—not a pine, is in many respects the most remarkable tree in the world, and forms eight tenths of the forest area of the Northwest, and extends over a larger territory than any other tree on the continent, and so far as I know, in the world, reaching from far up in Alaska down to Mexico, from the Pacific shores to the Rocky Mountains. This tree, it may be said, is the glory of our forests, and of an economic and commercial importance, scarcely yet comprehended or dreamed of, and is destined to form an important factor in the wealth and development of the State.

So highly is this tree appreciated abroad for its rapid growth and great adaptation to varied soils and climate, its elegance and the superiority of its wood, that through its forestry commissions it is fast becoming the forest tree of Europe. England, France, Germany, and Austria now have extensive forests of these trees, and are planting annually. Of our timber land nine tenths it is estimated belong to the class *Coniferæ*, and is evergreen, and as stated, largely Douglass false spruce, interspersed with cedar, yellow pine, sugar pine, spruce, and fir. These comprise a forest area estimated at seventy-five miles wide and three hundred miles long, containing sixteen thousand square miles of available timber, which, if placed on the market in rough lumber, would bring four thousand million dollars, and would more than pay the national debt. The trees of our forests, owing to the favorable influences referred to, are of rich, dark green foliage, rapid growth to enormous proportions, commonly from three to six feet in diameter, three hundred and fifty feet high, sometimes more, and one hundred and eighty-five feet to the first limb. This I state from actual measurements from trees prone on the ground. A visiting lumberman from Chicago a few days ago found a stick which squared six feet, one hundred and sixty feet long, which he had placed on three Union Pacific cars and took home as a curio. The Vice-President of the Oregon Pacific has

selected a tree three hundred feet high which he proposes taking to the World's Columbian Exposition intact.

Our most valuable lumber trees are Douglass false spruce, which I shall hereafter speak of, in the language of the lumbermen, as red and yellow fir; *Thuja gigantea*—red cedar; *Pinus ponderosa*—yellow pine; *Pinus Lambertiana*—sugar pine; *Abies Mertensiana*—white spruce, and *Chamaecyparis Lawsoniana*—white cedar. Of these there is a large, rapidly increasing commercial export by ship and rail, soon destined to bring to us millions of dollars annually. The superior qualities, distinctive merits, and various uses of these lumbers are matters of interest which cannot be considered at this time. A brief mention of some of the characteristic features, chief merits, and economic values of the red and yellow fir will fill the time allotted to this paper. This tree of compact, rich, dark green foliage is the very beauty of symmetry and elegance. It is of rapid growth, making eighteen inches to two feet in diameter and seventy-five feet high in twenty-five years, making fifty to one hundred cords of wood to the acre—of this I speak from personal experience—and in a few hundred to probably a thousand years attaining a maximum growth of from six to sixteen feet in diameter, and two hundred and fifty to three hundred and fifty feet and more in height, frequently being over one hundred and fifty feet to the first limb. Is it too much to say that such trees will make ten to forty thousand feet of lumber to the tree, or ten to forty cords of wood? We have thousands of square miles that will yield from fifty thousand to one hundred thousand feet, with a maximum of five hundred thousand feet per acre, and two to six hundred cords of wood, with a maximum of fifteen hundred cords and more per acre. These figures are all within the limit of actual experience.

In answer to an inquiry with regard to spars and piling, a timber dealer answers me: "In spars I will contract any number wanted, eighteen to twenty-seven inches at the butt, twelve to fifteen at the top, and one hundred feet long. Piling, any amount, size, and length to suit you." To show those who come after times the kind of forest Portland and suburbs were built in, I have reserved on my ground fourteen trees, six of which stand on an area of twelve by twenty-five feet, and average five feet in diameter and two hundred feet in height, one being seven feet in diameter and higher. These were our ordinary trees, of which I counted two hundred and fifty on one acre in my door yard, one of which made thirty cords of wood. To those interested, I extend an invitation to call and see specimens of twenty-six varieties of our Coniferæ in their habitat. The terms red and yellow fir, which designate a reddish fibred, rather coarse grained lumber, and a finer fibred, hard, compact,

yellow grained lumber of superior quality, are commonly supposed to designate two distinct varieties; but close observation of botanists has decided that this is not the case, and there is but one variety of Douglass fir; and that whilst red and yellow generally applies to different trees of this variety, from some mysterious and unknown cause in their growth, yet both red and yellow fir are found in the same tree. As stated, the yellow fir is more compact, finer grained, of greater strength and more durable, and for ship building, bridge work, railroading, spars and piling, and all structured works requiring great length and strength of timbers, there is nothing equal to it. Did time permit, it would be interesting to follow up the scientific tests made by the Government and railroads which have led to this conclusion; but for the present suffice it is to say that the matter is settled and being acted upon. Few of us fully appreciate the commercial importance and pecuniary magnitude of this fact. To emphasize this I quote from the Chicago *Northwestern Lumberman*, and letters received by the Pacific Pine Lumber Company. Referring to the tests of the Northern Pacific Railroad, the *Lumberman* says:—

“These experiments, it must be remembered, were made by the officials of the Northern Pacific Railroad for their own purposes in connection with the construction department, and without any intention of having them published. They were not made with any idea of booming fir lumber, but because there had been statements made ‘that fir was not as good as oak for bridge purposes, that it would not stand the same strain, and that therefore it would be better to use oak, even if they had to import it.’ On this account they are the more valuable. The tests made are decisive on the question of strength, both tensile and compressive. The tenacity of fir is phenomenal, and is equaled by no other wood.”

From letters to the Pacific Pine Lumber Company, I quote as follows:—

*E. M. Herrick, Esq., President Pacific Pine Lumber Company—*

DEAR SIR: In reply to yours of April 8th, in relation to Puget Sound pine—Oregon fir—say: We have used it extensively in constructing our bridges, buildings, and other structures of the Southern Pacific Railroad Company, and for such purposes we consider it amongst the best timbers in the world, as it can be had any length or size.

Below find data in regard to ultimate strength of Oregon pine (or Douglass fir), as per average of experiments made by us:—

Tensile-----	15,900 pounds per square inch
Crushing-----	6,000 pounds per square inch

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Transverse.....	13,630 pounds per square inch
Shearing with the grain.....	600 pounds per square inch
Modulus of elasticity.....	1,272,000 pounds per square inch

ARTHUR BROWN,

Supt. Bridge and Building Dept. Southern Pacific R. R. Co.

*E. M. Herrick, Esq., President Pacific Pine Lumber Company—*

DEAR SIR: In reply to yours of the 12th instant, would say that I have found Oregon fir an excellent material for ship-building, both for its strength and durability. Twenty-two years since I was one of a committee of surveyors appointed by a board of underwriters to examine the oldest vessels on this coast built of Douglass fir. We found them generally sound, and the iron well preserved with the gum and pitch of the wood. Amongst the vessels then examined was the big brig "Arago," then seven years old, and found sound, except where water had been leaking from a tank. The same vessel is now in good condition, and an insurable risk.

The bark "Wildwood," 1,100 tons, was built of Douglass fir in 1871, and was thoroughly opened by the "Veritas and Record Inspectors" of Boston in 1871; found sound, and class continued 33 L11 for two years in the former, and A1 for four years in the latter. Said bark is now eighteen years old, and shows no sign of gauge or work. I think she is the strongest and best wooden vessel of her age belonging on this coast.

Much more could be said in favor of the wood named, but I deem it unnecessary, as its excellent qualities are so well known in our country.

C. L. TAYLOR.

*E. M. Herrick, Esq., President Pacific Pine Lumber Company—*

DEAR SIR: In regard to your inquiry regarding "Yellow Fir,"—or as more commonly known, "Oregon pine,"—we would say: We have used it in our business of ship-building for the past thirty years. In that time we have built over seventy vessels, using in their construction almost exclusively the "Yellow fir." In no case has it failed to meet all requirements for strength, elasticity, and durability.

The schooner "Union," built by us in 1859, and now owned in Mexico, was at San Francisco a short time since for repairs. She was found to be as sound as when built. The "Ellen Adelia," built in 1863, and in constant use for twenty-five years, received a thorough overhauling. Every timber and plank in her proved to be in as good condition as when she left the ways.

We know of no other wood that is the equal of "Yellow fir" for

ceiling, planking, deck-frame, deck-plank, and spars. Its great size, and the long lengths in which it can be obtained, coupled with its adaptability for holding calking, render it almost invaluable to the shipbuilder.

HALL BROS.

*Pacific Pine Lumber Company, San Francisco, Cal.—*

GENTLEMEN: Replying to your question as to opinion of "Douglass fir," or "Oregon pine," as a structural material, we are much pleased to be able to state our conviction that no timber obtainable in abundance in the United States can compare with it in strength and lightness combined, and therefore in suitability for engineering structures.

The long-leaf Southern pine (yellow fir) of the Atlantic Coast and the white oak are the only considerable timbers approaching "Douglass fir" in strength, independent of self-support, and as both weigh at least 30 per cent more than fir, the latter is left unrivaled in quality, as it is, beyond doubt, in the extent of obtainable dimensions. We will take pleasure in furnishing you with data and drawings illustrating our practice in the use of this wonderful timber.

SAN FRANCISCO BRIDGE COMPANY,  
Per H. S. WOOD, C. E.

*Pacific Pine Lumber Company, San Francisco, Cal.—*

GENTLEMEN: In reply to your inquiry concerning our experience in the use of "Oregon pine," or "Douglass fir," we are pleased to say that we have used that timber (as well as all the other varieties of timber generally in use) for the past sixteen years, in all kinds of railroad and highway bridging, both in trusses, where the timber is subjected to heavy tensile and compressive strains, and in floor systems, where the timber must sustain the heaviest of transverse strains, and have also used the timber in various forms of structural wood work; and we are free to say, that in our opinion, for all such work it is the best in use. Its well-known qualities of straightness of grain, freedom from "dozy" or weak places, and the remarkable toughness of fiber, make it peculiarly well adapted to our use. We have seen nothing in American or foreign woods applicable to bridge and other frame constructions which is superior to it in economy of working, in strength, or in durability under strain.

ALFRED W. BURRELL,  
President California Bridge Company.

Another consideration of importance and inestimable value to the future of our State is the climatic influences and horticultural aspect of this subject, of which I shall write at another time.

The value to the State of this vast forest area in its modifying influence in preventing those sudden and violent climatic changes common to treeless regions, and in the prevention of droughts and disastrous floods in the conservation of the rainfall, which, being held in the leafy mold and cool, shaded forest soil, slowly percolates through the high lands in springs and gentle rivulets to the valleys below, filling the earth with moisture and furnishing a perennial supply of crystal, pure water, alike necessary for plant and animal life, form a grand system of sub-irrigation which has made this the land of never-failing crops. We are fortunate in the fact that for a long time vast areas of mountain heights of these wooded lands will be inaccessible to the lumberman, and let us hope that in the meantime the Government will see the importance of making the necessary forest reserve to secure us against the disastrous results of forest denudation.

## PLANTING TREES IN FEBRUARY.

How and when to plant trees is a matter of great importance to the beginner in orchard work. As a general rule as soon as the rains come to make the ground workable is the time to plant, and also as a rule, it is decidedly better to plant trees in autumn than in spring, and always better to plant early than late in the spring.

Our own experience proves this, for one year when planting prune trees in November, heavy rains set in, and it became necessary to heel down several hundred trees until spring. It was the middle of March before the ground was in order again, and when we took up the buried roots to transplant them permanently, tender shoots had already grown out from the roots of the young trees that were three or four inches long. Of course, the trees that were planted four months previous had these rootlets safely growing to aid the season's development, while the trees pulled up from their winter's bed lost the tender growth, all being killed by exposure. The later results showed how important fall planting is, for the trees planted in November made a vigorous growth and had a good start, while those planted in March did not develop until late, so that a bug (small, gray, shell-back, and spidery), appearing at the same time, ate out the heart of every bud as it put forth, preventing any growth until late in the spring, after these pests had disappeared.

By all means set out trees in the autumn, if possible, and as soon as the rains of that season shall have made it possible to work the soil. Trees so planted will have every possible advantage and

grow to a surprising degree, and bear fruit sooner for having so good a start. There is no location or character of soil where it will not pay better to plant in the fall than in the spring, though there undoubtedly are occasional seasons when trees planted late can make successful growth.

We recollect that Mr. Mathiot, of Butteville, once told us of planting some fruit trees for Rev. Mr. Fackler in very early days. These trees had been purchased early and heeled down. They were overlooked until very late, as Mr. Fackler did not think to have them planted out, as he was traveling about attending different churches where he held regular service. When he noticed the trees, they had put forth leaves, and it was then well into May. He went to his neighbor, Mr. Mathiot, and asked him to set them out, and that gentleman said they made excellent growth, as the season was favorable. While this was undoubtedly true, it is not safe to take the chances, for these very trees would have done still better had they been planted out early in the fall. While "better late than never" is a well known proverb, it is always better never to be late.

How to plant trees to the best advantage is a matter of prime importance to beginners. We began planting trees by digging holes in ground plowed level, and one day had helping me an old Oregon farmer, who gave us the benefit of his experience. He said he had planted two orchards, that both did well, and his way had been to plow the lands in width he intended the trees to be apart, and then to plant in the dead furrows. For instance, if prunes were to be a rod apart, he plowed lands sixteen and one half feet wide, set stakes across the furrows a rod apart, sighted by those stakes, and put down pegs where the trees should be planted. Digging a loose bed for them and fining the soil, he drew around the roots of the trees the fine, soft surface soil about and among the fibrous roots and pressed it among them so as to leave the roots well covered in. Common sense will teach any one to do this in the proper way. Of course, the dead furrows must be plowed out with a good team and a large plow that can go deep. In this way trees can be planted easier, better and at less cost than by digging holes. A good workman can easily plant an acre a day. Trees should be planted a trifle higher than they stood in the nursery, so that when the earth sinks with them they will be as they stood before they left the nursery. If well done this way of planting will produce as good trees as can be desired, and when the ground is plowed toward the trees, the dead furrow will be filled up and the orchard will present a level surface.

If you have not yet planted your trees, do not lose a day that



you can plant trees in, with the ground in good order, but set them out as soon as you can, in February if possible.

If you can possibly underdrain your orchard land before planting the trees, certainly do so, for the benefit to the trees will be greater than you can imagine, if you have not studied the effect of proper underdrainage. In the next issue we shall set forth some facts concerning the method of draining land with tile, or in any way to produce the proper results.—*Fruits and Flowers.*

## SCIENCE OF FRUIT EVAPORATION.

Read by A. H. CARSON, of Grants Pass, at the April meeting, 1892.

The area of country that can be made available for a market of green fruit on the Northwest Pacific Coast is large. But the great producing capacity of our orchards, now in bearing, and the young orchards that will come into bearing in two or three years, will be such that after supplying the demand for green fruit we will have a large surplus to prepare and find a market for. The question now for us to discuss is, in what way shall we prepare this surplus so as to reach distant markets at prices that will pay the producer?

The cannery is one of the methods of preparing fruit for distant markets, but the outlay of capital for a plant to begin with, besides the necessary funds to supply it with fruit during the running season, is among the obstacles that makes the cannery impracticable to the average fruit-grower.

To make fruit-growing a paying business, the means should be within the control of the producer to hold his crop until the demand is strong enough to warrant him a reasonable price for it.

From my experience and observation, I am convinced the most practical method for the grower to dispose of his surplus crop, is to be prepared to evaporate it. If properly done, he can hold his crop; is not forced to place it on a weak market. On the question of transportation, he has reduced his crop to the minimum number of pounds, and can ship to distant markets.

True, prices this year for so-called evaporated fruits have ruled low, but when I take into consideration the quality of most of the evaporated fruits I saw displayed in the Portland markets the past winter, I wonder consumers could be induced to buy them at any price. That choice evaporated fruit this year brought remunerative prices I can testify to. I had no trouble in selling bright, pared peaches at eighteen cents per pound, which is equivalent to three

cents net per pound green, while my prunes—five tons—brought me eight cents per pound.

Here is a little extract from the *Rural Northwest* of April 1st, published at Portland, Or., which says:—

“J. H. Fletcher, of Vancouver, recently shipped a lot of prunes to Lieut. Eastman, at Leavenworth, Kansas. Lieut. Eastman acknowledged the receipt of the prunes, saying that he had made quite a sensation among the grocers and others of that place by showing them samples of the prunes. They had never seen such prunes before.”

You will see from the foregoing we do not have to go very far East with a first-class sample of evaporated fruit to cause a “sensation.”

This, to an intelligent, observing fruit-grower is a suggestive lesson, and one he should profit by.

To create a demand and an extended market for the products of the orchard, he must use skill in preparing and putting on the market his evaporated fruits, so that wherever they may be shipped they will always make a “sensation” by their superior quality.

Now, I assert as a fact: It costs the producer no more to make and place on the market first-class evaporated fruit than it does an inferior grade. The labor is the same. It is only a question of knowledge and skill, and this being true we come to the science of fruit evaporation. To understand what true evaporation consists of, let us consider the chemistry of evaporation, for which I am indebted to an able article on that subject by Dr. J. F. Simonds, of Fayetteville, Arkansas. Dr. Simonds says:—

“In the process of sun-drying, the fresh cut surface of the fruit begins to grow dark immediately, or to rust, by the action of the oxygen of the surrounding air, and so the water slowly evaporates, the process of oxidation continues, and goes deeper and deeper, until the whole cellular tissue is involved, and has become tougher and harder, and more indigestible, while the sugar, starch, albumen, and gluten undergo a slow process of ferment and decomposition. None of the starch in the fruit is converted into sugar as it should be, and the sugar already existing is slowly converted into vinegar, so that a sun-dried apple is nothing else than a spongy piece of hardened cellular tissue, filled with dried hydrated starch, fermented albumen, and gluten, combined with vinegar, the result of slow fermentation. The changes take place, and the product is the same in all slow processes of drying, either in ovens or kilns, or in the same so-called evaporators, except that the dark color, fermentation and souring, which takes place in sun-dried fruit during the drying occur afterwards in that dried in ovens and kilns, or slow evaporators.

"I will now describe the process of true evaporation. It has been found that by removing a part of the water rapidly, in swift moving currents of air, heated from 240° Fahrenheit, a different product is the result, wholly unlike either the fresh or sun-dried fruit, and which will keep better, is more digestible and nutritious, is less acid, and will sell for more in the market. But, if after having heated the air hot enough there is not sufficient circulation, or the currents are not rapid enough, the fruit will cook and then dry, or burn the same as in a close oven. Apples will cook in boiling water at a temperature of only 212° Fahrenheit, or bake in an oven of 225° Fahrenheit, but if the heated air circulates fast enough, the fruit will not cook or burn, or become itself heated to the temperature heated by the thermometer, even at 300° Fahrenheit, for the evaporation of water is a cooling process, and every particle of vapor leaving the minute cells which contained it carries with it also a large amount of caloric in a latent form, and thus keeps the heat of the apples far below the surrounding air. The chemical change which belongs to truly evaporated fruit will now begin, and the albumen, instead of being slowly dried, coagulates precisely the same as in an egg when boiled. The soluble starch existing in all the fruit, and composed  $C_6H_{10}O_5$ , will, if the heat is high enough, combine with one equivalent of water ( $H_2O$ ), so that we now have an entirely different compound, to wit: glucose, or fruit sugar, which will assist in the preservation of the fruit, instead of being liable to decomposition as the dried starch is in sun-dried or a slowly dried product.

"All the pectine or fruit jelly remains in the cells undecomposed, or is left upon the surface by the evaporation of the water in which it was dissolved, and may be seen condensed upon the surface, instead of being decomposed, and passed on with the starch and gluten into the acetic fermentation. Its diastase, or saccharine ferment, contained in all fruit, and which is the primary cause of its decay, has been rendered inoperative, and all germs of animal or vegetable life have been destroyed by the high heat. It is by this chemical change which I have briefly described in uniting a part of the water already contained in the fruit with the fruit starch, that these truly evaporated products are rendered more wholesome, more digestible, more indestructible, and are thereby made more valuable, not only as articles of food, but because they are not subject to deterioration and loss; and it is also the reason why a bushel of apples will make more pounds of evaporated fruit than can be made by sun-drying it, as a portion of the contained water which would otherwise be lost is retained by combining with the starch to form glucose, and the carbonic acid which is always lost in the slow

decomposition resulting from sun-drying is retained in its natural combination with the other substances composing the fruit, and hence it is heavier.

"These profitable and healthful chemical changes which I have mentioned are in accordance with the laws of nature, and are certain to take place if the necessary conditions of heat and air, as I have detailed them, are properly supplied, otherwise you will have a different product, and no matter how fine your apples, how perfect your paring, coring, and trimming, or how white you may have bleached them, you have not made truly evaporated fruit, and no matter how many may have been deceived by its bright color, or full weight, or fancy packing, your fruit will not stand the test of long keeping in warm, damp weather. The natural starch, gluten, and albumen of the fruit, instead of being cured, or made indestructible by the chemical changes which constitute the difference between the evaporated and dried fruits, will absorb moisture from the air, will swell or increase in bulk, and be attacked by mold, will absorb additional oxygen, and finally sour and decay."

It will be seen by carefully considering the chemistry of true evaporation as given us by Dr. Simonds that the essential requirements for the perfect evaporation of fruits, is hot air, and a rapid circulation of the same through the fruit.

Hot air without rapid circulation cooks the fruit, generates steam, precipitates it again upon the fruit, causes the fruit to burst open, and the fruit jelly to drip, thereby causing a loss of the necessary elements belonging to its perfect preservation.

Where the circulation of hot air in your evaporator is constant and thorough you carry off the moisture, and avoid re-precipitation and dripping of the juices, and to retain the fruit jelly in the fruit, and the result is you have a superior grade of evaporated fruit that is always in demand.

A practical idea suggests itself to my mind in connection with the object of evaporated fruits from the Pacific Coast that in a business sense we can consider with profit to Oregon fruit.

Our California neighbors use the sun for curing their fruit. We, on account of our climate, must use evaporators. It may be asked: Can we, with the additional expense of building and operating evaporators, compete with them in the markets of the East? My opinion is there can be no competition between the sun-dried, dust-sulphured article as compared with the bright, clear, perfectly evaporated fruits of our evaporators. Our California neighbors, to compete with us, will have to use the evaporator. Then we yet have an advantage in larger and finer prunes, and cheaper fuel. The following extract from the Los Angeles *Times* carries with it a

suggestion that we can profit by. It says: "There should be more attention paid to the drying of fruit in such a way as to make it free from dust and insect larvæ, and to putting it up in neat and convenient packages. If our dried fruit could be relied upon to carry over to another season, Eastern dealers would take hold of it with more confidence, and prices would rule better. Excessive sulphuring, and open air drying, are methods which might be abandoned with much benefit to the output."

We see from the foregoing that "excessive sulphuring, dust, and insect larvæ," do not inspire confidence with Eastern dealers. By the use of the evaporator we avoid dust, and kill all insect larvæ, and if the fruit is properly boxed in tight boxes, immediately after it leaves the evaporator, we remove the possibility of its ever becoming wormy, and the Oregon evaporated fruits would eventually "inspire" a confidence with Eastern dealers, that would surely give them a reputation that would make their orchards a source of profit far in excess of what they are now.

Let us as fruit-growers of the great State of Oregon work to that end. Wherever Oregon evaporated fruits may be shipped they will always cause a "sensation."

In the discussion that followed this paper: There is no dripping in evaporation of fruit if the circulation of air is perfect. No competition between sun-dried and evaporated fruit. Fruit will not become moldy or wormy when put up in boxes at once after drying if put in boiling water and glycerine thirty seconds and boxed tight. Glycerine keeps fruit in a soft plump appearance and keeps preservation. Some commission men endeavor to get the producers to ship their fruit in sacks in order that it can be worked over and make a fine looking article; from it they thus get fruit at low price and sell it at high. Good fruit should always be packed in attractive boxes.

Mr. Hoskins said that he had lost considerable money during the past season by packing his boxes on top of each other. He supposed the fruit had got damp from excessive rain, as it had slightly molded.

Mr. Uren said that by mixing one pint of glycerine to twenty-five gallons of water, and adding two pounds of honey, the fruit would have a fine appearance and its preservation would be helped greatly by being dipped therein.

The best boxes found so far for shipping fruit had been those manufactured by the Sugar Pine Manufacturing Company of Grants Pass, and fruit nicely packed in nice boxes added at least 15 per cent to the price of the fruit. These boxes can be laid down at Portland with the necessary paper for packing at about 16 cents for a 50-pound box and 13 cents for a 25-pound box.

Several of the members objected to the manner in which California took Oregon prunes and used them for layers, shipping them East as California fruit. They also objected to this same State getting Columbia River salmon and sending it East as Sacramento River salmon. Mr. Hoskins stated that the only thing necessary for the Oregon people to gain a good market at fair prices was to let the Eastern people know what we produced. To prove this he gave his experience of finding a market for his fruit. Four years ago he went to Portland to sell a carload of prunes, but could get very little satisfaction from them, so concluded he would start and find a market.

Getting money together he took his better half and started East. After looking around and showing his samples he had the car shipped and gave the Eastern men leave to sell the fruit for just what they could get for them. He realized but 7 cents per pound for this fruit, but the next year he shipped to the same market and realized 12 cents, and last year, notwithstanding the exceedingly low and depressed condition of the market, he realized for his best fruit the handsome sum of 14½ cents per pound net. Mr. Allen also said that all that was necessary for Oregon to sell fruit was to let the world know what we had for sale, and to prove his statement spoke of the high words of praise received by Mr. Ricker, of Vancouver, who some time ago shipped fruit back to Boston, where one of the greatest prune experts in the world gave them the highest recommendation. He also spoke of the exhibition at New Orleans where Oregon took the four first premiums and sweepstakes on different kinds of prunes.

Mr. Hendershott mentioned the Golden Prune, which was but little known by the Society, except one member said that he had sold the fruit for one cent more per pound than the Italian.

Mr. Hoskins now gave an interesting talk on "Pertinent Points on Packing and Handling Prunes."

He had not prepared a paper, because he thought he could tell all he knew without it, and he was surely right or else he had an inexhaustible store of knowledge on the subject. He began by saying he had made a mistake last year which caused him a loss of \$200, and he did not propose to do so again. Prunes should be well dried and packed; should be thoroughly ripe; that is, they should be ready to fall. For picking Italian and Petit prunes a canvas should be spread upon the ground under the trees, which are well skaken, and in this manner greatly reducing the cost and trouble of picking. The Silver prunes must be picked from the trees by hand. Every prune-grower should have a grader, which will probably cost about \$75. This grader will remove the leaves,

stems, and dirt, as well as separate the fruit into four grades, which, making each grade uniform in size, greatly facilitates drying, as the fruits will thus dry evenly. The grower should have evaporators in running order as soon as the fruit begins to fall, so that he can have the fruit dried fresh, and get it packed out of the way as it ripens. After this graded fruit has been dried, grades No. 1, and perhaps No. 2, should be packed in 5-pound boxes, and made as attractive as possible, eight of these boxes in a crate; No. 3 should be packed in a 25-pound box, and No. 4 should be packed in sacks, because of the great saving in prices of boxes and freight. His prunes were quite fine last year, many hundred pounds of Silvers averaging eighteen to the pound. They ran from sixteen to forty; French ran from forty-five to eighty. When prunes run from 80 to 130 they should be packed as the lowest grade, while those over 130 should be destroyed or fed to the hogs.

## FRUIT PRODUCTION AND MARKETS.

Read by HON. H. B. MILLER, of Grants Pass, at the April meeting, 1892.

It is a very serious question in the minds of producers of fruit, as well as those contemplating the business, whether or not the near future will bring a great over-production. There is good reason for a careful investigation of the subject. A complete examination of the matter in every light will, no doubt, result in doing much good. In as grand a country as the Rogue River Valley, with its vast possibilities in fruit culture, with its great uncultivated mountain slopes of fruit land where grapes, peaches, apples, almonds, plums, prunes, pears, and apples grow so luxuriantly, and yield such handsome profits, I know it is unpopular to even hint at over-production, or recognize that the subject is worthy of discussion.

With thousands of acres of the best fruit land of the coast surrounding us on all sides and remaining in the state of nature, untouched by the intelligence of man, the one who dares breathe the idea of over-production of fruit is deemed a traitor to his country. Nevertheless, there is in the subject much food for thought, and hidden under cover of over-production is much that when exposed to light, will be called by other names. Perhaps the weakest characteristic of humanity is to shift the burden of our ignorance and indolence upon other people, upon our Government, or upon our Creator. A man ignorant of the demands of the market, or advance in the science of cultivation, produces upon old and unculti-

vated trees a hundred bushels of inferior, wormy apples; these he takes to market in potato sacks or dirty boxes; and the result is a great cry of over-production. His neighbor, finding the market always good for first-class red winter apples, produces two thousand bushels. By careful trimming and cultivation, by full knowledge of the adaptibility of his soil and climate to the production of his fruit, an intricate knowledge of pests, and proper methods of destruction, and by a perfect system of work in putting his knowledge to a practical use, he produces a fruit that sells at his orchard for one dollar per bushel.

Instead of over-production of fruit, this actual experience of the past year, which I have made as an example, shows conclusively that the great danger is under-production of intelligent thought, and its application to the business. As a proof of the danger of over-production of fruit, we have been referred to the great over-production of wheat. While no one can deny the over-production, yet a careful study of the cause reveals the fact that the reason of over-production of wheat will be the very means of preventing an over-production of fruit.

Wheat became cheap because it could be produced in almost every part of the world; because it did not require a high degree of intelligence to produce it. Under the rapid development of cheap transportation, both on sea and land, the great plains of Russia, including Siberia, the vast domains of India, South America, Algeria, Australia, and North America sprung, as if by magic, into waving fields of golden grain. The increase in the population of the world, although enormous, did not begin to keep pace with this increase of grain, nurtured by the development of improved implements and cheap transportation, whereby all the nations of the earth were brought into closer commercial relations than the various counties of a single State maintained during the eighteenth century. While all this could bring to the price of wheat nothing but utter demoralization, what does it mean for fruit?

Wheat or its substitute for food is the product of every State and nation, but this is not true of fruit. In prunes, France, Italy, Germany, and the Pacific States of North America are the only true prune countries, and in these their production is limited to certain locations, while their consumption and a demand for them is growing throughout the civilized world.

The prunes of Oregon have taken the prize over the French prune raised in France, the German prune from Germany, the Italian prune from Italy. What then have we to fear in the over-production of prunes?



Oregon apples are finding markets in Montana, British Columbia, Dakota, Alaska, California, Arizona, Colorado, Texas, Louisiana, Mexico, China, Japan, Australia, and England. Our pears are sought for in every market where they can be had; and what country can produce cherries superior to those grown in Oregon? We find, first, that fruit differs from wheat, in not being the product of all countries; we find also that our market is growing broader, without an effort on the part of producers; we find, under the rapid development and cheapening of transportation, that our markets will outgrow our production. As the high cost of transportation has been cited as one of the dangers of over-production, I will call your attention to the following facts: From 1870 to 1890 the average freight rate on railroads has been reduced from over two cents down to less than one cent per ton per mile. This reduction is still going on, and under the rapid development of the use of power by electric transmission, I am firmly convinced that the rivers of our Continent will be used as the motive power of transportation, and result in a tremendous reduction of cost. While the cost of transportation is now a hindrance to profitable production, ten years will find that difficulty entirely removed.

That locality which produces any kind of fruit the best, will have such an advantage as will establish the industry upon a profitable basis beyond a question. That country which is best fitted by soil, climate, and men for the production of certain fruits, will have almost a monopoly.

Pests furnish, perhaps, the strongest argument against over-production. A friend, a short time ago, when advised not to put out an apple orchard because of the great danger of pests, replied that it was his only reason for planting fruit trees; hundreds of men would give up the fight, dig up their orchards in disgust, and leave him a good market.

Fruit food is a part of the support of human life, sought for and eaten by every man, woman, and child, increasing in demand with the advancement of civilization. From the commencement of the use of steam as a motive power up to 1880, a tremendous increase of agricultural products in all quarters of the earth was so much greater than the increase of population that a serious depression in all lines of agriculture was the result. Recent statistics show, however, that the tide has already turned, and the population of the earth is at present increasing much faster than new agricultural areas are being brought under cultivation. There are very few of vast, undeveloped, productive regions now unused to be brought under cultivation.

In both North and South America, as well as in Europe and Asia,

cattle and other domestic animals have driven wild herds from off the plains. Wheat and corn fields have driven from most of these same plains the cattle; all this has occurred within the memory of very young people. The rapid growing demand of food for man will cause fruit to drive grain from all fields susceptible of producing good fruit with much greater speed than the cattle drove off the wild herds, or the grain-grower drove the cattle from the plains. It is a well-known fact that the human family must depend upon the vegetable kingdom for life-sustaining food. The great mass of humanity today lives on a vegetable diet, because its life-sustaining qualities are so much cheaper. A very small per cent of the people consume much animal food—the vast majority are vegetarians, as it were, not from choice or belief in a physical or moral light, but of necessity. Meat is a manufactured product for which a large amount of raw material is required. The manufacture of meat is a process of transforming the vegetable protein, fats, carbo-hydrates of grass and grain into the animal protein and fat of beef, pork, and mutton.

The same principle applies in the production of milk, eggs, and other animal foods. In the most economical feeding of animals, it takes a number of pounds of hay or corn, and still he must consume a large quantity of soil product to produce a small amount of animal food. Hence, animal foods are costlier than vegetable. This is the simple explanation of the fact that in most parts of the world meat is the food of only the well-to-do, while the poor live almost entirely on vegetable food. Thus ordinary people in Europe eat but little meat, and in India and China they have none at all; it is hard enough for them to get the nutriment they need in vegetable form—meats they cannot afford. The masses eat little or no meat today because of high prices; the proportion of meat-eaters in the future, under rapid increase of population and increased cost of meat-food, will, no doubt, be much less.

There is a philosophy called the doctrine of Nolthus, which claims that population increases in geometrical, while the food supply increases in arithmetical ratio, and that it is only a question of time when there will not be enough food to supply human life. While I am not a believer in this theory, I believe the time is near at hand when the quantity of food per acre must be largely increased. An orchard that will produce, year after year, at a moderate estimate, five hundred bushels of apples per acre will certainly provide food for many more people than if sown to grain. The logic of events indicates beyond a question that the growing necessities of our day demand an increased quantity of fruits. A full line of statistics in the channels of thought which I have suggested,

if I had time to present them, would prove beyond a doubt that there is no real danger of over-production of fruits that are especially adapted to the soil and climate of the locality.

There are, however, many dangers ahead to the fruit-grower, to which he should direct more attention than to the question of over-production, and as my subject—Fruit Production and Markets—will admit of their consideration without straining it, I will endeavor to suggest a few. To the competent fruit-grower, the entire is concentrated under the heads of soil, climate, and market. It is a mistaken idea, for instance, that any soil will produce good apples. If you are thinking of producing apples, you must first convince yourself, by broad study of the subject, that your locality will produce the very best; second, that the advantages of markets are in your favor, taking into consideration the quality you can produce. These being settled you begin search for the land especially adapted to the fruit. The land must be of the strongest and best soils, and have perfect, natural or artificial, drainage. From experience and observation of apple orchards, I am firmly convinced that not more than one tree in ten being put out in Oregon today, will bear marketable fruit in ten years. Only a limited portion of Oregon is especially adapted by climate soil and to the production of first-class apples. Prunes are, no doubt, more generally adapted to the common conditions, than any fruit we raise; and yet, experts will select a few spots that surpass all others. The next problem that confronts the fruit-grower is cultivation, and the next, destruction of pests. Both of these require an amount of study and practical skill that will baffle three fourths of those who undertake it.

If your selection of a place for your orchard has been wise, and your care and cultivation successful, years of toil bring forth the fruit that is prime and that the markets demand; but your labor is not ended for your fruit is not sold. The commission men and transportation companies stand ready, anxious, and willing to gather to themselves the results of your years of study, care, and toil. The consumer may be willing to pay ten cents per pound, but if you are not careful eight cents per pound will be absorbed in getting it into his hands. This is no fancy sketch, for I have paid in Portland ten cents per pound by the box for grapes that brought the producer at Jacksonville only one and three-quarters cents. The producer then must by some plan or individual effort, or better still by organizing with his fellow-producers, follow his fruit to the market, and see to it, that the share he gets, out of the cost paid by the consumer, is equitable and just. Perhaps the greatest lesson and most important of all that the fruit producers of Oregon have to learn is the value of organization for their common good in producing and marketing their fruits.

The vast majority of the people of the Pacific Coast are too prone to depend exclusively upon individual effort where only the strongest work of combined organizations will succeed. While I would rejoice in seeing the vacant hills and valleys of Southern Oregon covered with vines and fruit trees, for which they are so well adapted, I believe it will require our strongest manhood to make it successful. The problem in this country is not conditions or markets so much as it is men, competent and capable of making the industry a success. I recollect at an institute, where the questions of pests, markets, and over-production were discussed, listening to the plea of an old man who had his all invested in a small orchard, begging the men in charge to settle all these matters for him, and provide him with instructions whereby he might save his fortune. The incident, had it not been pitiful, would have been ludicrous. One of the unfortunate teachings of fruit-land boomers is that fortunes are to be made in the fruit industry without either much physical or mental effort, while the fact is exactly the reverse. There is, perhaps, no vocation in life which requires such accurate and energetic mental force as horticulture, for men engaged in this must deal with nature in all of its ever-changing works. Rules and formulas are worthless, unless you are thoroughly conversant with all of the principles involved in their use. The strongest and most independent manhood is required to make it successful, and the man who achieves eminence in this vocation is strong enough in body, heart, and mind to be a leader in any of the avenues of life. If you are a young man, and desire to develop your best manhood, enter the field of horticulture. It will aid your physical and provide unbounded limits for your mental qualities. If, however, you are hunting for an easy life, large returns for small physical and mental energy, and expect to find it in horticultural pursuits, you will surely fail, and by the time your first crop of fruit is on the market you will be singing the song of over-production, and cursing the Government for your want of prosperity.

## A PERNICIOUS PRACTICE.

We have noticed a number of reports recently in papers published throughout the Northwest, of persons who have been planting fruit trees received from the East. Not infrequently a fancy price is paid for some trees under the impression that something rare and especially valuable is being secured. This practice of buying fruit

trees from distant States is both foolish and dangerous. There is no business better established in the Pacific Northwest than the nursery business, and our leading nurserymen are among our most reliable and honorable citizens. The trees they offer for sale are such as are adapted to our soil and climate, and their practical knowledge will enable them to give valuable advice to intending purchasers as to the varieties best adapted to each one's special conditions. The chances of success are certainly ten to one in favor of the home nurseries as against the Eastern. Not only is the buyer far more likely to get reliable trees which will grow and do well by patronizing our home nurseries, but he also runs far less risk of getting trees infested with pests.

The State Boards of Horticulture of Washington and Oregon are doing all in their power to prevent the planting of infested trees in these States. They are able to inspect the grounds of the nurserymen and to compel the proper treatment to keep the trees in such nurseries clean of pests. There is no practical way known for them to inspect the great number of packages of fruit trees received from the East at the different railway stations throughout the two States. The introduction of pests in this way is one of the most annoying and perplexing things with which the Boards have to contend.

An effective attempt to inspect all such importations would be blocked by the excessive expense and the scarcity of skilled inspectors.

Under the circumstances there is no more effective method of meeting the evil than by creating a public sentiment against this pernicious practice of ordering fruit trees from agents representing Eastern nurseries.— *The Rural Northwest.*

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## NUT CULTURE IN OREGON.

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Read by HENRY E. DOSCH before the Oregon State Horticultural Society at the Grants Pass meeting.

There are two kinds of trees which have a special charm for me. One is the lordly Pine, and the other the royal Walnut. Though a great lover of all nature and admirer of all trees, these two stand head and shoulders above them all in my humble estimation. He, or she, who never wandered among the Pines, inhaling the fragrance of its needles and invigorating ozone, and he, who has never listened, while reposing in its shade, to the whispering spirits in its topmost branches, so soothing to the soul, has missed one of the

great pleasures given to mankind by an all-wise Providence; while the royal Walnut in its grandeur, its strength, its inspiring nature, is ennobling and elevating and imparts a warm, inviting, and dignified appearance to any home-place.

Wherever you see a Walnut tree in a door-yard you may rest assured that warm hearts dwell within, and you are equally assured a hearty welcome in a hospitable home.

The English Walnut is to the orchard what the rose is to the flower garden; ever fragrant, ever charming, whether in leaf, in bloom, in fruit, or in winter denuded of its foliage.

You may think me an enthusiast. Possibly I am, but if you wish to succeed with either tree, shrub, or flower, you must love them, and raise them as you would a child. It may be a little more trouble, but the result will more than justify the loving care, labor, and time.

There are orchards in Oregon which look like their owners loved them truly, and some which remind me of Topsy in Uncle Tom's Cabin. They were not raised, but, like Topsy, "jes' growed,"—weeds, sprouts, and all.

When, some years ago, I retired from business and bought the out-of-town place on which we now live, my first thought turned to the cultivation of English Walnuts, though the place had been cultivated for over forty years, and had all the other varieties of fruit growing. Knowing little or nothing of the habits and growth of the English Walnut, except when we were boys we thought our neighbor's walnuts better than our own—I began to read up, and to inquire of those whom I saw had large Walnut trees growing, but was informed that Oregon was not a nut-growing country, as some of these trees were thirty years old and had never borne any fruit. I concluded that there must be some reason for this, as I could not convince myself that a country which grew every kind of fruit to such perfection as Oregon, having all the advantages in soil and climate that France and Germany have, where the English Walnut flourishes abundantly, could not grow that royal fruit, and soon learned that the variety planted here was the Los Angeles, the most delicate Walnut grown, which thrives on this coast only in a few counties of Southern California, brought there by friars of the early Spanish settlements.

Feeling that there must be other varieties, I wrote to a large grower in California for trees which he thought best suited to our climate, and of such large size as he could recommend to transplant and do well. He sent me five-year-old trees of the "Second Generation" Preparturiens and Serotina varieties, which were duly planted with utmost care, and every attention given afterward, but

did not seem to do well. Over half of them died after struggling along a year or two, and for four long years after planting the remainder stood still, all of which was caused by the cutting of a large tap root. What few lateral roots they had were barely sufficient to keep them alive, but last year they made some headway and bore a few nuts, which shows that the trees have finally established themselves. It was a great mistake. Had I planted yearlings I would have had better results, which I only learned, however, by actual experience. I have some three-year-old trees transplanted at yearlings, which have as large heads and are nearly as far advanced as my nine-year-old trees are, which were transplanted at the age of five.

All nut-bearing trees, as is well known, have a tap root and very few lateral roots; now it stands to reason that when a tree is small the tap root also is small, and will not be mutilated in transplanting, but I also learned by actual experience that the lateral roots of a properly grown yearling are nearly as large as of a five-year-old tree; hence, when transplanted, the top of the tree being small, about 6 to 12 inches, will have plenty of nourishment and support from both the lateral and tap roots, and unquestionably make a better and stronger tree than one whose tap root has been cut off, notwithstanding the assertion of some nurserymen that it makes no difference whether the tap root is cut off or not; nature knows best. A yearling Walnut tree that has made a top growth of from 6 to 12 inches, has a tap root of from 15 to 30 inches. If it did not require a tap root you may be assured nature would not have put one there.

If it were not for the retrogradation of the Walnut when planted from seed, I would advise the planting of the nut where the tree is to grow, but as we are told by those who have made Walnut culture a life study that but few varieties will prove true to seed; we are compelled to buy the trees from those who grow from grafted ones, or as they are called, second generation trees, which are grown from the nut of the original grafted stocks. As stated before, one must have a love for Walnut culture to make it a success.

This beautiful valley in which you are located seems to me the very ideal place for Walnut culture. Your rolling hills and slopes seem especially adapted for it, and there is no good reason why we should not raise at least all the nuts used in the Pacific Northwest. Remember you have a large territory to supply. Those of you who were here in the days of old—the days of gold—will remember the many nut stands in every mining camp, many of which still exist in Montana, Idaho, and even Oregon. Then, large quantities are now used as dessert fruit, but more particularly the demand for

candied nuts, which latter has developed to very large proportions in the East. From recent reports, the imports of last year amounted to five million dollars, so there is no danger of overstocking the market in the near future.

In France and Germany large quantities of nuts are pressed into oil, and sold all over the world as "olive oil." The residue, or oil-meal, being sold as feed for milch cows and other stock; what can be done there can also be done here; the market for this product is right at our orchard gates, and for many years will be very meagerly supplied with the home grown article.

As to varieties to plant suitable to our climate, I would name "Second Generation" Prœparturiens, Serotinas, Mayette, Franquette, Chaberte, and perhaps Parisienne, Vourey, and Cluster, and possibly the improved soft-shell Walnut. The latter is claimed to prove true to seed, and is growing nicely with me, but not yet in bearing, and may not be adapted to our climate, being considered rather delicate and tender.

Having made your selection of trees, put the place in which you wish to plant them in perfect order, dig the holes three feet wide by at least two feet in depth and forty feet apart, then fill them up again, bottom soil on top, all of which can be done in the fall and winter and be ready in spring for planting, which is a very particular piece of work; tap roots straight down, spread out each lateral root carefully as you proceed to fill the previously reopened hole, sifting in fine dirt as you go, the tree to stand a little higher than in nursery rows, thus allowing for settling down, and when completed you may rest assured your trees will grow, and beyond cultivation, require no further attention, no spraying, and no pruning.

However, if you wish to experiment as I have done, by planting the nuts, procure them in the fall as soon as they drop, fill some boxes with light soil and sand half full, then put in the nuts, pointed end up, about one inch apart, cover three inches deep, and place out of reach of rats, squirrels, and gophers, keeping the soil moist; on examination in the early part of April you will find that they have sprouted; that is, they throw up two sprouts from the pointed end of the nut. One of these turns down over the nut and forms the tap root, and the other continues upward and forms the tree. Now remove them very carefully, as these sprouts are very brittle and easily broken, which would make the plant worthless. Plant them either where you wish the plant to grow (by far the best way), or in nursery rows about five inches deep, and transplant the following spring. There is no fruit tree that is so indifferent to location, exposure, or soil, as the English Walnut, and gives good results even on land not fit for any other use; but it is grateful for



better soil by going into bearing sooner and yielding larger crops.

Walnuts usually go into bearing in five or six years; at twelve years are in full bearing. In Ventura County, California, trees of the latter age are said on undoubted authority to have yielded from \$15 to \$20 worth of nuts. It is not a slow grower, as I have been led to believe, four to six feet being not an uncommon growth in one season; besides it is a healthy tree, having, comparatively speaking, few pests to molest it; and once established, lives to a good old age, and proves profitable to generation after generation with but little care. The Walnut is very difficult to graft, which, according to Prof. Budd, is owing to the rapid evaporation from the scion while the slow process of uniting with the stock is going on, which also accounts for the very high price of grafted trees.

This year I planted about three hundred yearlings of my own growing, and have now sprouting about five hundred more of English Walnuts, besides Butternuts, Hickorynuts, and Pecans.

Among the other nut-bearing trees with which I am experimenting is the Pecan, a native of the land known to us when boys as "Dixie Land." The Pecan is very unlike the English Walnut, as it requires rich soil and does best when grown on bottom lands along rivers or creeks, and delights particularly in such bottoms that are subject to overflow. It is a stately tree and when properly planted will grow as gracefully as a Southern belle. Like all nut trees, however, it is very difficult to transplant; even more so than the English Walnut, as it has a long, straight tap root, and no lateral roots worth speaking of, and in this particular it resembles the shell bark Hickory, hence the nut should be planted where the tree is to grow, though transplanted when very small will do. The Pecan, known as the Louisiana or Texas Pecan, produces nuts, when grown from seed, of very irregular size, and to avoid this the usual method adopted is to plant the nuts where the tree is expected to grow, and when sufficiently large are either grafted or budded (without disturbing the roots) from trees known to bear large sized and uniform nuts, though seedlings often produce very nice fruit.

There are varieties which are claimed to prove true to seed, such as the Van Deman and Stuart, which are doing nicely with me, both large and exceedingly fine and nutty.

The Pecan is a true bearer, and it is claimed that a tree yields, under fair conditions when in full bearing, from \$10 to \$20 worth of nuts. They generally go into bearing at the age of six to seven years, and when once established require no care whatever, not even cultivation; in fact they do better when the land is sown to grass and pastured. Those that I am now raising were grown from the seed and transplanted as yearlings, and those transplanted this

spring have made as much as two and three inches in growth, and all have started and are doing well.

“Under the spreading chestnut tree,  
The village smithy stands.”

What a beautiful thought, but no doubt you all know Longfellow's poem by heart. He could not have selected a better one, for a Chestnut tree is a poem in itself.

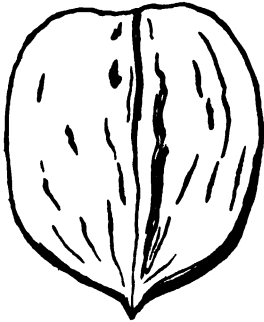
There are many good and well established varieties in Oregon, but there are some superior to other; one of these is the Grosse Precose, sure bearer, rapid grower, prolific, and healthy tree; nuts, good size and sweet; all good points. The Combale comes next, and then the Merle. The American Sweet is too well known to require description. These are all grafted trees, as seedlings are very indifferent as to fruit, and should be planted and treated the same as the Walnut. The market, however, for this fruit is more limited, but for family use is unsurpassed for flavor or nourishment, whether roasted, used as a vegetable, or as a stuffing for fowls.

From a commercial standpoint, these nut-bearing trees are not only valuable for their fruit, but also for their wood. Everybody is acquainted with fine walnut furniture, and costly at that, particularly what is known as French walnut veneering.

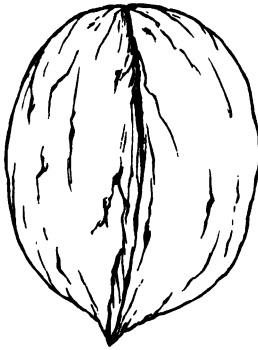
Pecan timber, especially, is susceptible of a very high polish, having a fine grain, and is exceedingly handsome for finishing either furniture, or for paneling in house work.

I endeavored to obtain the exact figures of importations into Oregon of all kinds of nuts, but failed. The various wholesale merchants, however, who deal in them, tell me that between \$300,000 and \$400,000 would come very near the amount.

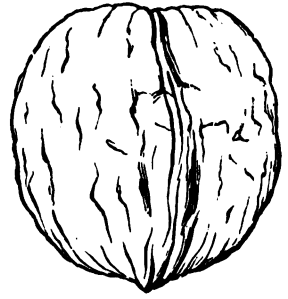
In conclusion, I beg to say that I have demonstrated to my own satisfaction that the English Walnut will do well here and bear fruit in paying quantities, and hope I have been sufficiently explicit in this paper to induce others to profit from my experience. If you cannot or will not plant a grove, try a few trees, and I am confident that you will never regret having planted the English Walnut.



**Fig. 1.**

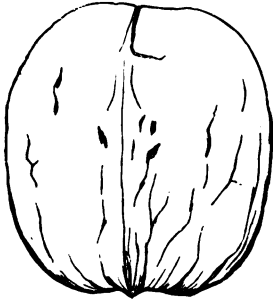


**Fig. 2.**

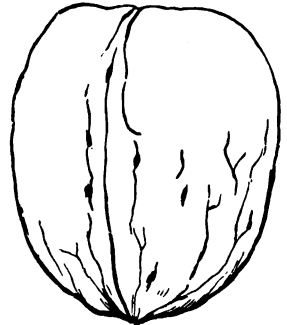


**Fig. 3.**

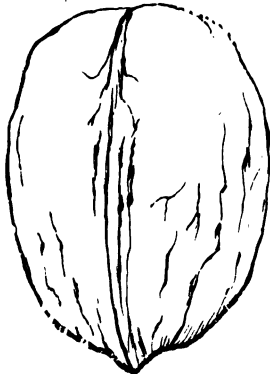
**"SECOND GENERATION" PRÉPARTURIENS WALNUT.**



**Fig. 4.**  
**PARISIENNE.**



**Fig. 5.**  
**MAYETTE.**



**Fig. 6.**  
**FRANQUETTE.**



**Fig. 7.**  
**CHABERTE.**

We are indebted for these cuts to Mr. Felix Gillet, of Barren Hill, Nevada City, Cal.

**Prœparturiens or Fertile Walnut,**

**Second Generation.**—This famous variety of the *Juglans Regia* family was introduced by us into California in the winter of 1870-71; and in our grounds, 2,600 feet up in the Sierras, are the first trees of that kind that ever produced fruit in this State. Second generation nuts are in the average much larger than those of the first and third generations, 75 per cent being from medium to large, and 25 per cent from small to medium; all are perfect soft-shell and of first quality. The Prœparturiens is one of the most productive kinds, and bears large crops from the start, hence its first name of fertile.

**Mayette-shaped Prœparturiens.**—Nut large, sitting on its big end like the Mayette, hence its name. Full-fleshed kernel of first quality; heavy bearer. Solely propagated by grafting.

**Third Generation Prœparturiens.**—The kind of Prœparturiens so common in California, and sold as genuine Prœparturiens. It is grown from nuts borne on second generation trees. Third generation Prœparturiens trees have but few of the characteristics of the original left, except its good bearing qualities. The nut is generally small—too small for market—though very thin-shelled and of first quality.

**Cluster Walnut (*Juglans Racemosa*).**—This remarkable kind of walnut, also introduced years ago by us into this country, is a worthy rival of the Prœparturiens; it derives its name from the Latin word "racemosus," meaning abundant in clusters, full of clusters, which is the main characteristic of the Cluster Walnut, whose nuts, when the tree is in full bearing, grow in clusters of eight to fifteen nuts, and even twenty to twenty-eight. The Cluster, like the Prœparturiens, reproduces itself well enough from the seed, provided that the nuts be gathered from trees grafted from the original. Our trees are all second generation trees, with probably a percentage of 80 per cent true, that is, of having retained that particular characteristic of the variety, of growing long clusters of nuts. The nut is thin-shelled, from medium to large. As a matter of course, the trees have to be old enough to bear large clusters of nuts. The nuts of grafted trees are real beauties, with the end hermetically closed and a smooth, well-shaped shell.

**Mayette Walnut.**—This is one of the finest dessert nuts grown; it is quite large and uniformly so, well shaped, with a light colored shell; the kernel is full fleshed, sweet and nutty. But what renders this remarkable kind so much more valuable is to be very late in budding out, which enables it to escape the disastrous effect of late frosts in the spring; it is also an abundant

bearer. This is the nut imported into the United States under the name of Grenoble, but on account of the duty of three cents per pound, as the nut is a high-priced nut in France, a common and cheaper grade is mixed with it, to the disgust of nut importers in New York and Chicago. The Mayette was originated by a man of the name of Mayet, about 125 years ago, the nut having ever since been a great favorite.

**Parisienne Walnut.**—This beautiful nut, also one of the finest for dessert and market, was originated in the southeast of France, and not in the neighborhood of Paris, as its name would imply; its beauty made it called "Parisienne," in honor of the capital of France. The nut is large, broader at the small end than the Mayette and the Franquette, and has a very pretty shape. It is as late and hardy as Mayette.

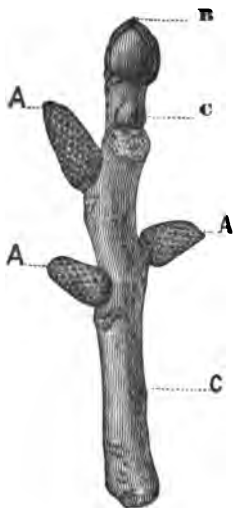
**Franquette Walnut**—Originated about the same time as the Mayette in the southeast of France, by a man named Franquet. It is quite large, of an elongated oval, and very attractive; kernel full-fleshed and sweet. It buds out late in the spring, and has never been injured by frost on our place, though quite high in the mountains.

**Vourey Walnut.**—This new and valuable kind is of recent introduction, and was originated near Vourey, in the southeast of France, hence its name. It resembles in shape the Mayette, and is one of the hardiest kinds introduced by us into this State. The nut is somewhat smaller than Mayette.

**Serotina, or Late Walnut.**—We find this variety to be so late in budding out as to not be injured by late frosts in the spring. The nut is of medium size, well-shaped, with a very sweet nutty meat; heavy bearer. It is this variety that from the seed produces the "After Saint John" walnut, budding out on St. John's day (20th of June). The "After Saint John" is a small nut.

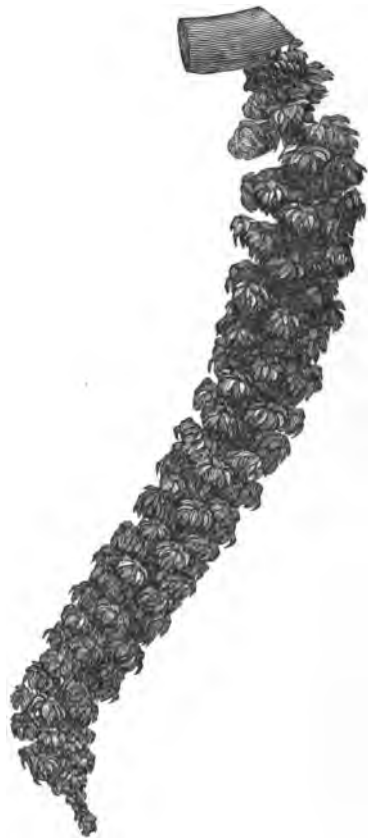
**Chaberte Walnut.**—An old and most valuable variety; late in budding out. The nut is well shaped, roundish-oval and of fair size, though it is not what is called a large nut; the kernel is of extra fine quality; good bearer. The Chaberte was originated over a century ago by a man named Chaberte, hence its name.

**California Chaberte.**—This most pretty nut, the sweetest raised in our grounds, has been originated by us from a nut borne on a grafted Chaberte. This nut is only of medium size, shell very thin and of light color, which gives it a fine appearance. The kernel is full-fleshed, exceedingly sweet and nutty, with a pellicle of a very light yellow or cream color. Propagated true only by grafting.



**Fig. 1.**

Staminate and pistillate buds of  
the walnut, in a dormant state.  
A—Staminate bud.  
B—Pistillate bud.  
C—Leaf bud.



**Fig. 2.**

Staminate bud of the walnut, or catkin, in  
full bloom, or male blossoms.

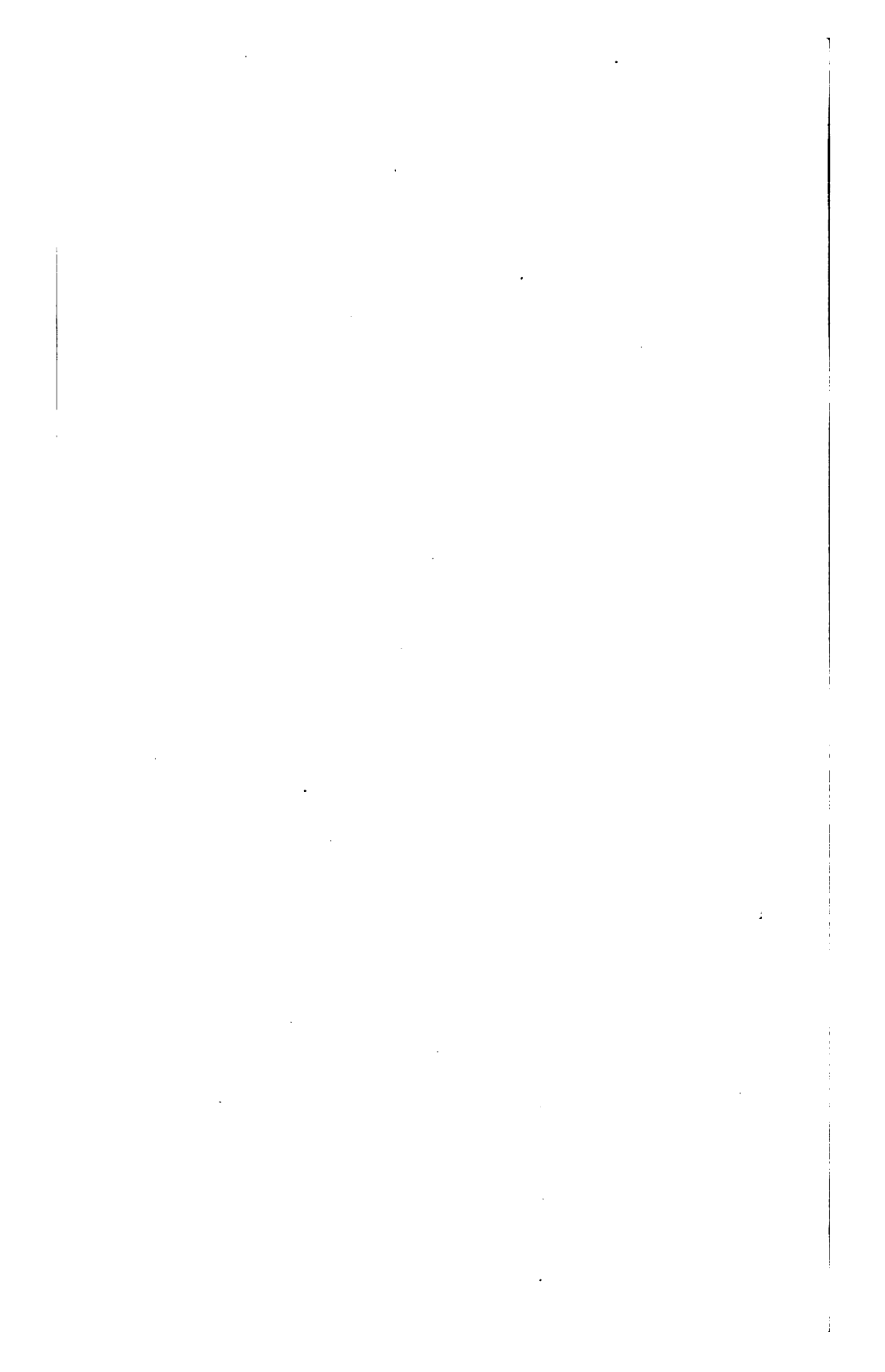


**Fig. 3.**

Pistillate bud of the walnut in full  
bloom, or female blossoms.

Walnut blossoms, of natural size and "from nature," as grown on Second Generation Pro-  
parturiens trees, on Barren Hill, Nevada City, Cal., by Felix Gillet.

[Copyrighted.]



## A NEW HORTICULTURAL INDUSTRY.

The admirable article on "Nut Culture in Oregon," which appears in this issue, calls attention to a branch of horticultural industry which is as yet in its extreme infancy in the Pacific Northwest. It will probably surprise many persons to know that the value of nuts brought from abroad to Portland amounts to between \$300,000 and \$400,000 annually. The consumption of nuts, as well as that of fruit, is increasing in a more rapid ratio than the population in the United States. It will not be many years before the trade in nuts in Portland will amount in round figures to one million dollars per year. If we have here the proper conditions of climate and soil for producing the greater portion of such nuts as are consumed here, it is a matter of much importance that they be produced here. The more fully our markets can be supplied with articles of home production at a profit to the producer, the more prosperous will this section become.

Mr. Dosch has laid the foundation for the successful culture of the English Walnut in this section. No one but an enthusiast of scientific habits and tastes, would have accomplished what he has done, and with the true spirit of a scientific investigator, he most willingly gives to the public the benefit of his studious research and painstaking experiments.

Mr. Dosch also treats of the Pecan and the Chestnut. Pecans have long been popular, but it has not been until quite recently that the practice of planting them has been engaged in. Many cultivated varieties are now upon the market, and they are likely to gain in popularity. There is no climatic reason why they should not grow in suitable localities in this section.

The Chestnut is quite well established in the Pacific Northwest, by way of experiment. Readers of this paper will remember that Mr. W. S. Failing has found that in the Willamette Valley the lack of lime appears to interfere with the productiveness of some varieties of the Chestnut, but there are other sections in which he believed these varieties would bear most abundantly.

What Mr. Dosch has done for the English Walnut, Mr. A. H. Carson, of Grants Pass, has done for the Almond. His article on "Almond Growing in Southern Oregon," published in the *Rural Northwest* of February 15th, shows that Southern Oregon is well

adapted to the culture of Almonds and that it pays to raise them there. It is believed that there are sections in the eastern portions of Oregon and Washington where they may be profitably cultivated. —*The Rural Northwest.*

## PERTINENT POINTS FOR FARMERS AND FRUIT-GROWERS.

Prepared by PROF. F. L. WASHBURN for the Grants Pass meeting.

There are some things which should be known as well by would-be successful horticulturists as by economic entomologists; certain simple facts about insects and insecticides, a knowledge of which is absolutely essential to the agriculturist. For instance, every farmer and fruit-grower should know that all insects, after hatching, pass through a larval or worm-like stage, and it is in this stage that they generally do the most damage. Then they enter a transition stage, as it were, known as the pupal stage, and finally they turn into perfect insects or imagos. These changes are called metamorphoses.

Beetles (*Coleoptera*) are hard-winged or hard-shelled insects. Moths and butterflies belong to the order *Lepidoptera*, and the larvæ producing these are called caterpillars. A certain order of insects, *Hemiptera*, the bugs, and the only insects which can be truly called bugs, get their nourishment by sucking. It is utterly impossible to kill bugs with Paris green or London purple, both internal poisons, for the reason that bugs do not eat the outside of the leaf, which is coated with the poison. The insect pests in this order, viz., Green Aphis, Woolly Aphis, Scale insects, etc., call for an application of some external irritant, or some oily agent which will clog up the breathing pores.

The larvæ of *Lepidoptera*, viz., the Apple-worm, which is the larvæ of the Codling Moth, Tent Caterpillars, Peach-tree Borers, etc., are provided with strong jaws by means of which they are enabled to eat the leaves or fruit or gnaw the wood of fruit and other trees. These it is plain can be killed by an application of arsenical poisons. Comparatively few farmers realize the necessity for different treatments as illustrated above, and how many there are who use Paris green for the Green Aphis, and perhaps attempting to use pure kerosene for the Codling Moth unless prevented by some kind intervention. It is time that every farmer and fruit-grower was familiar with these facts.

We are prompted to refer here to a question asked at a recent meeting of the Oregon State Horticultural Society: —



"Which is the best for a tree, lye or whitewash"? Did that query come from a well-posted horticulturist? He should have stated the pest or pests he wished to kill. Whitewash with a little crude carbonic acid in it is an excellent preventive against Borers, while lye put on the trunks and branches would not do much good as a preventive. Lye used at the right time and of proper strength, a very important consideration, would be effective in killing Scale insects and eggs of various injurious bugs, as well as the bugs themselves. In other words, it is as impossible to kill all insects with one kind of treatment as it is for one medicine to serve as a panacea for all the ills of man. Be careful how you purchase from unscrupulous or ignorant dealers concoctions warranted to kill all and every insect. As a rule such concoctions are humbugs. It must be said, however, that certain new agents just coming into notice promise something toward our ideal of an all round remedy.

The per cent of arsenic in London purple varies with the consignment, while in Paris green it is fixed. It would seem then that Paris green, as far as its effects on foliage is concerned, is the safer agent of the two. A test for the quality of Paris green is to take a small quantity of the powder and add to a little water; if the poison is good it should unite readily with the water and form a mixture of the consistency of cream. One pound of Paris green to 200 gallons of water is too strong for the foliage on this coast. One pound to 250 gallons for the first spraying, one pound to 300 gallons for all subsequent sprayings are the best proportions.

"There's no use spraying; I've tried it," is a remark often heard from farmers. The words smack too much of a mossy origin, and invariably they can be traced to non-observance of directions in mixing or applying the solution.

Before judging of the merits of a certain treatment for an insect pest—before condemning it, at least—one should be absolutely sure that he has faithfully followed directions. Every fruit-grower and farmer should realize the value of the meetings of horticultural societies and farmers' institutes, and should appreciate the advantages accruing to himself from attending such meetings. The interchange of ideas and experiences at these meetings are worth a great deal to those present.

Spray pumps? There are many good ones on the market. Read the Bulletins from the experimental stations and horticultural boards for hints on these points. In buying a nozzle the fruit-grower should consult his own especial needs. One nozzle will make a fine fog, another will put enough on the tree to cause the liquid to drip from the leaves, and still others which deluge the tree. If one is spraying for the Codling Moth or leaf-eating insects, a fog is

what is needed, and these nozzles are more economical than the others. If, however, the Woolly Aphis is to be sprayed, a nozzle which sends a considerable amount of liquid with much force is the most desirable.

Every agriculturist should know that all insects are not injurious, that some are neither injurious nor beneficial, they are innoxious. Some forms are very useful, in that they prey upon injurious species.

No intelligent farmer will allow rubbish to accumulate about the orchard and farm, nor will he let moss remain upon his trees, for such are retreats for insect foes; but realizing that an ounce of prevention is worth a pound of cure, he will burn all waste, cut out all dead limbs upon which moss gathers, and will by thorough cultivation make his trees healthy, and thus help them to resist insect attack.

Finally the farmer should as far as possible learn from reliable books or some competent authority the appearance and habits of injurious insects and thus know when to attack them, whether in the larval, pupal, or perfect form. There are many good works on this point with accurate illustrations of injurious and beneficial species, notably "Insects Injurious to Fruits," by William Saunders (Lippincott & Co.); "Injurious Insects of the Orchard and Vineyard," by the late Matthew Cooke of California (H. S. Crocker), good illustrations and descriptions, but remedies antiquated; Harris' "Insects Injurious to Vegetation" (Orange, Judd & Co.). In addition to these and others are the official publications of each State, which can be had for the asking, and the publications from the United States Department of Agriculture at Washington, which are distributed free. In agricultural papers one sees many communications which are worse than worthless. Take, therefore, only the best of these papers and give credence to no statement which does not bear the stamp of authority.

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## INDIGENOUS ORNAMENTAL PLANTS.

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A paper read by DR. J. B. PILKINGTON, of Portland, at the meeting at Grants Pass, April, 1892.

With a few notable exceptions, which, so far as I know, can be counted on one's fingers, the botanists and explorers of our State are yet to be educated. We may mention the names of Howell, Hammond, Henderson, Cusick, and, though not a professed botanist, that splendid woman explorer and writer, the Clio of our North-

west empire, Mrs. Frances Fuller Victor, whose lately published volume, "Atlantis Arisen," should and must be considered an indispensable book to every library in the Northwest; yet for half a century Bryant's "Thanatopsis," and that wonderful "Hymn of the Forest Cathedrals" have been among the most honored classics of American schools.

The wild flowers of Oregon are hardly inferior to those of sub-tropical regions in beauty and fragrance, and outrival those of any other corresponding belt of the temperate zone.

Until within a very few years, our native trees, shrubs, and flowers have been considered of little or no value for ornamental purposes. Even now the nurseryman who would attract attention to his catalogues must enumerate French roses and Clematis, bulbs from Holland, and trees from any other land than our own, if he wants to make sales. In India, China, Japan, the Islands of the Sea, anywhere than our own land, and the farther away the better, explorations are being made for floral adornments for our parks, gardens, and homes, while our own incomparably rich native plants remain neglected and unknown here, much more known in England, France, and Germany.

We seem either to forget, or else must confess to the ignorance of never having known, that all our cultivated flowers are wild flowers in other parts of the world. Per contra, our wild flowers become, though to a less degree, the cherished and pampered pets of other countries, and foreigners begin to scour our wilderness in search of our neglected orchids, bog plants, ferns, etc., to plant in what it awakes their pride to call their AMERICAN gardens. By a little common sense treatment of our wild flowers, they become easily domesticated, and they are wonderfully well adapted to the beautifying of flower gardens, rockeries, or ponds, large or miniature, and especially to parks and large grounds. Let us glance superficially at some of them.

#### ORCHIDS.

Among the handsomest, strangest, and most lasting flowers of the floral kingdom may be mentioned orchids, and no private collection of ornamental plants is deemed "up to concert pitch" without some representatives of this imperial family. Mr. Howell enumerates nine varieties, and it may be worth while to note the fact that while the demands from Eastern gardens and Europe aggregated several thousand plants within the past year, not an inquiry has ever been made for one, within my limited experience of five years, from Oregon.

*Cypripedium Montanum*, *Epipactis Gigantea*, *Goodyeara Menziessii*

are three varieties which are freely found here in Southern Oregon. The *Calypso Borealis* and *Cypripediums* are the kinds most in favor in the East.

#### IRISES.

Of *Irises*, Fleur-de-lis or Flower-de-luce, the national flower of France, thirty-eight species are to be found in Oregon that are worthy of perpetuation. Of these at least eight or ten varieties grow abundantly here in Southern Oregon, to-wit: *Iris Macrospion*, a dwarf species with showy white or cream colored flowers; *Pænia Brownii*, which has handsome cut leaves and small brownish flowers; *Phlox Adsurgens*, a trailing species with rose colored flowers; *Sisyrinchium Grandiflorum*, with large purple flowers and one of the most striking looking plants of the Northwest; *Tellima Grandiflora*, *Vancouveria Hexandra*, *Viola Hallii* (or Hall's Violet), and the showy *Xerophyllum Tenax*, bearing long spikes of small white flowers in early summer.

#### BOG PLANTS.

Of bog plants there are several varieties, the *Darlingtonia Californica*, or Pitcher plant, with its peculiar shaped pitchers and nodding brown and yellow flowers, and the *Lysichiton Kamtschaticensis* (which, despite its terrible name is one of the finest plants, having more of a tropical appearance than any other of our Northwest flora), being two of the most noticeable, and held in great admiration by Eastern gardeners.

#### BULBS.

Of bulbs, Mr. Howell enumerates twenty-nine varieties, of which at least nine are found in this county, to wit: *Brodiaea Congesta*, *B. Hendersoni*, *B. Lactea*, or white *Brodiaea*; the blue *Camas*, a *Calochortus*, an *Erythronium*, and three varieties of *Fritillaria*.

Of the *Liliums*, four kinds grow in Jackson County, and therefore presumably grow in Josephine.

#### ORNAMENTAL SHRUBS.

Of the many very noticeable shrubs growing on the western side of the Cascade Range, the *Rhododendrons* come at once to mind. *Rhododendron Californicum*, or *R. Maximum*, is a glorious flower plant. Its immense trusses of variegated pink flowers make wondrous waves of gorgeous bloom on your mountain sides, on the sandy chaparral cliffs of the ocean counties, and in places in the Cascade Range, as I am told. (If color and luxuriant beauty were all we had to consider, this would represent the western valley as a State flower, but this is a subject to come up later.)

The *R. Occidentale*, or *Azalia Occidentale*, with its fragrant trusses of white and yellowish flowers most of you are doubtless familiar with. I am told that *Rhododendrons* are difficult to make live. I can only say that of a thousand or more plants of both kinds which I obtained very early in the year, and have set out in a little sandy valley running through my place in Portland, the *Azalias* are all alive and doing well, some of them preparing to bloom; of the *R. Californicum*, the small plants are doing fairly well. The large ones (two feet and over) will all die, I think. I gather that if they live a year or two, and can be transplanted several times, they seem to acquire viability, and thereafter take kindly to their more civilized home in the garden. I have sent both these varieties in quantity to Professor Lake, now of the State Agricultural College at Pullman, Washington, and have also sent specimens of each for trial in the State Experiment Station at Berkeley, California.

Scarcely less beautiful in their way than these are our *Ribes Sanguineum*, or Flowering Currant, and our *Berberis Aquifolium*, or Oregon Grape. The former, with their pink and scarlet bloom, the latter, with its yellow blossoms and varnished green leaves, always awake admiration until their commonness tells upon us. These, with the summer-blooming *Spiræ Arizæfolia*, or "Ocean Foam," seem to have attracted the attention of travelers visiting Portland more than anything else our forests produce.

Of the shrubs in which these three varieties are classed there are some twenty-five ornamental varieties, of which sixteen to twenty kinds grow more or less abundantly here in Southern Oregon, all of which should be domesticated in our flower gardens.

Of deciduous and broad-leaved evergreen trees, some eight or ten kinds are at home along the isotherm which runs for 500 miles along the western slope. They are the *Acers*, or Maples; *Arbutus Menziesii*, or Madrona; *Castanopsis*, Dogwoods, Ash, Oak, and Buckthorn. Of the first, the broad-leaved Maple has notably given to Portland, Salem, and Albany, and some other towns, whatever of beauty of street decoration they possess. The vine-maple copses, with their scarlet and crimson thickets of flame, make one to imagine them gorgeous conflagrations in Fairyland, and call forth expressions of mingled wonder and delight from all fall tourists.

#### CONIFERÆ.

Of *Coniferæ* some sixteen varieties—taken as a whole—may challenge an impartial and admiring world to find their superiors. Our worthy president, who for several years, more or less, has collected, observed, and written upon these, is an authority upon Conifers. They are the Firs, or Spruce, the Cypress, Cedars, Juniper, Larch,

Pine, Yew, and Arbor Vitæ. Concerning these wondrous members of "God's first temples," there is but one consensus of opinion. Says Professor Henry Gray, F. R. S., of England, one of the great anatomists of the world: "You should never import any evergreens; the Northwest already has the finest in the world." Similar expressions have been made by Dr. Parry, a botanist and collector of world-wide fame; Professor C. S. Sargent, of Harvard, and editor of *Garden and Forest*, and Dr. Engelman, the great botanist and writer of St. Louis, now deceased.

#### FERNS.

In no other family of plants does more of grace and beauty inhere than in the ferns, and from nowhere in the great forest can such a forest in miniature be obtained as from varieties of this family. In what exhibition of social life are they not an ornament? At receptions, dinners, weddings; at christenings to celebrate our births, or in church chancels to solemnize our obsequies. Everywhere they are at home and appropriate. There are some twenty varieties named, and all, from the diminutive *Cheilanthes Gracillima*, or "Lace Ferns," with fronds of six inches in height, to the giant *Woodwardi* of six feet, are worthy of attention. It may be a little premature to promise, but we hope to exhibit all of these at our Portland Exposition in October next.

Having got thus far, I happened to get hold of the April number of *Fruits and Flowers*, and find that Professor Henderson has come into the journalistic field with the first of a series of articles which will cover the subject of the flora of Oregon and Washington more fully, probably, than anything yet written. His conspectus makes ten grand divisions of our flora. Here offers an opportunity for an advance in popular knowledge of our great resources in the way of ornamental indigenous trees and plants, and I trust that the attention of hundreds may be drawn to garden and park ornamentation. As long ago as 1887 it appears that a list of all species and varieties known to exist north of California and west of Wyoming (the great Northwest) comprised 252 species and 227 varieties of plants. In the five years that have intervened, some hundreds more have been added, and new discoveries are still being made. This causes us to rank already very high in the botanical wealth of nations, as according to McCarthy's statistics, the flora of the British Possessions in North America, which contain a larger area than the United States, embraces but 5,000 species against 10,000 each in Europe, Australia, and the Islands of the Sea.

#### OUR STATE FLOWER.

A question which comes legitimately before the State Horticultural Society of Oregon is, "What shall we choose for our State

flower?" In the heraldry of nations for more than a thousand years it has been the custom of every State and nationality to choose some representative of the floral kingdom, as an emblem of its history, power, or quality.

Thus, in the eighth century, when good St. Patrick drove the snakes out of Ireland, he chose the Trefoil, or Shamrock (emblem of the Trinity). Two hundred years later, when the Norsemen invaded Scotland, seeking to surprise the sleeping Scots, one of the invaders trod in the dark upon a stemless thistle, and the imprecation which this drew forth, awoke the Scots, who drove their enemies back, and thus the thistle became the emblem of Auld Scotia. Later still, Louis VII. of France, emblazoned the Fleur-de-lis upon his escutcheon, and so today the lily stands for France, as the white and red roses commingled commemorates the union of the rival houses of York and Lancaster in England. Year before last California choose the *Escholtzia*, or Poppy, for her State emblem. Let us select a flower to carry the floral honors of our great State. It should represent us by its general diffusion; should be hardy and beautiful; should be a single flower capable of being worn as a button-hole bouquet, and capable of reflecting honor upon its sponsors in baptism, and upon this rich and rare land in which it has its birth. The *Rhododendrons*, the *Spirææ*, the *Dogwood*, and several others have been mentioned to me.

I suggest that the Society consider this matter here, appoint a committee to agitate the subject through the press, and then lay the matter on the table until the next quarterly meeting of the State Horticultural Society in July next.

For the sake of starting the discussion on the subject, I move you, Mr. President, that the *Gaillardia Aristata*, or Bearded Gaillardia, be selected by this Society as the State flower of Oregon, and hope to have a second.

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## ORCHARD FENCES.

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A paper read by R. D. ALLEN, at the Hood River meeting of the Oregon State Horticultural Society.

A trip through the principal portions of the Willamette Valley will convince any one of the importance of more attention to the subject of orchard fencing on the part of fruit-growers.

Next to protecting fruit trees against the ravages of fruit pests, draining, and winter killing, must be considered the matter of protection against goats, hogs, and other breechy stock, and particularly against raccoons, which I have found in my own experience to be a

very destructive animal. In many portions of our best fruit-growing districts, these "varmints" are very numerous; and their taste for fine fruits is well developed. I have known them to come for miles to sample my prunes and peaches; and like the bad boys who go "cooning," are never satisfied with what they can eat, but will knock it off by the bushel and waste it. Where they have unobstructed access to a prune orchard, they will do more damage in one night than a band of hogs in a field of shocked wheat. Neither ordinary rail fence nor the barbed wire fence is a barrier against them. The old style rail fence is neither safe against coons and goats, nor a thing of beauty. It has had its day. It served its purpose when there were no goats to clear up our grub land, and when big red apples were so cheap that even coons were not begrudged what they wanted to eat and waste. It served its purpose in the good old days when wheat was \$1 per bushel and made 30 to 50 bushels to the acre, and the farmers had nothing else to do during the winter season but put up fences after each south twenty-mile gale; and then there is the old-fashioned plank fence, which is very costly, short-lived, and offers no resistance against coons or bad boys.

The fence for the fruit-grower, as well as the ordinary farmer, is that which will take up the least possible space of land, offer the least harbor for "varmints" and insects which prey upon fruits, and affords the best possible protection against domestic and wild animals, combined with cheapness and durability. Such a fence has been adopted by some of the leading fruit-growers of the Willamette Valley, which I will try to describe. Mr. F. J. Beatty, who has a fine orchard near the Indian Training School at Chemawa, near Salem, incloses his grounds with what he terms the "Combination" fence, which is made of four-foot pickets split out of fir timber, as near  $1\frac{1}{2} \times \frac{3}{8}$  inches as they can be made, woven in eight strands or four double strands of No. 14 galvanized wire, by means of a machine, costing him \$18. The wires are first securely fastened, two in a place, to the stranding post, which is well braced and anchored to a tension post set in the ground just beyond the last post on the line of the fence to be built. The desired tension being secured by means of the device connected with the tension post, the pickets are held in place by a cable twist of the double strands of wire made automatically by the machine. The fence is securely fastened to the posts, which should be set twelve feet apart, and from two to two and one half feet in the ground, and five feet above the ground; each alternate post, however, need be only three feet above ground. A strand of barb wire is placed on the top of the posts and drawn to a proper tension. It is better to nail the pickets



to the posts instead of using staples, as the latter may eventually cause the wires to break at the points where they come together. Split pickets are much better than sawed ones when made of good fir timber, and are much cheaper. One man can cut his own timber and split out from 1,000 to 1,500 such pickets in one day, and it will take four to the foot or sixty-six to the rod. Mr. Beatty used four pounds of wire to the rod, using eight wires. If sawed pickets are used they should not be less than five-eighths of an inch thick, straight grained, no sap or knots.

A fence built in this manner will last for years, and will be an effective protection against animals of all kinds.

On my own grounds I have built a fence somewhat similar to this, using only four strands (two double strands) of No. 11 annealed wire, requiring three pounds to the rod, and pickets split from fir timber  $1\frac{1}{2}$  x 1 inch thick and four feet long, using one strand of barb wire on top. In weaving the pickets, the wire is simply crossed by means of a simple device which can be made by any one for fifty cents. When this style of fence is properly made I consider it a very good one. The principal point in making such fences is to have the wire stretched to a proper tension, the posts to which the ends of the wire are fastened securely braced so that the wires will remain permanently tight, and to avoid the use of staples, which cause the wires to break. The pickets should never be wider than  $1\frac{1}{2}$  inches, and should be placed that distance apart. Mr. Beatty says he can weave fifty rods a day with his machine.

The device I use is made as follows: Take a good fir board, dressed down to  $1\frac{1}{2}$  x 5 inches,  $2\frac{1}{2}$  feet long, make a mark five inches from each end, and draw a line from these marks along the wire one and one-quarter inches from edge. Mark out the inside space, leaving a bar  $1\frac{1}{2}$  x  $1\frac{1}{2}$  inch with a four-inch block at each end, which dress to a circle. Dress bar to make it nearly round. Take two blocks  $5$  x  $5$  x  $1\frac{1}{2}$  inches. On opposite sides, about one inch from end, make slots one inch deep and wide enough to admit No. 11 wire. At the opposite side, about one inch past center, bore a three-eighths inch hole; pivot these to rounded blocks left on bar described, and the device is ready for work. The wires are placed in the slots in the pivoted blocks at each end of the bar, and will be thus spread about three inches apart, which is sufficient to admit a picket. It is easily operated by an upward movement when the wire is crossed, another picket admitted, then a downward movement crosses the wire again and another picket is put in, and so on. A good hand to adjust pickets in their place and a boy to operate the device can make fifty rods of fence per day.

The object in making pickets narrow is to offer as little resistance to the wind as possible.

## THE PRUNE.

A paper read by A. H. CARSON, of Grants Pass, at the Hood River Meeting, July, 1892.

The first attempt at growing prunes on the Pacific Coast was about the year 1856 near San José, California, by a man by the name of Pellier, who brought the scions from France. Pellier's experiment proved very successful, but it was a long time before the people of California realized that prune-growing for the markets of the world could be made the leading and most profitable of all her great horticultural undertakings. The majority of the fruit-growers of the Pacific Coast entertained an idea that to grow and cure a first-class prune was beyond the ability of any one excepting an "old countryman," who had spent a lifetime in the business in France or Germany. The idea was nurtured that there was a mystery connected with the process of growing and curing prunes, and not until recent years, when the prunes of the Pacific Coast were shipped to the New York and Chicago markets, and came into competition with the imported prune, did the Pacific Coast prune grower realize that in soil, climate, and process of curing the Pacific Coast prune is superior to the imported prune, commanding a better price in the market, and in appearance and quality much superior to the prunes of France and Germany. This fact having been established, about ten years ago prune-growing, in a small way, began to receive the attention it merits in Oregon. As a great many beginners in prune-growing in Oregon are in what I call the "experimental stage of prune-growing," I shall, for their benefit, give in this paper my experience in growing and curing prunes.

I have been growing and curing prunes for twelve years, and I claim to have had success in that line; yet, had I understood the characteristics of the different varieties of prunes, and their adaptability to soil and climate, the proper age of trees to plant, cultivation, pruning, grading, curing, and marketing of the crop that these twelve years have given me, I am sure my success would have been measured by that knowledge.

### VARIETIES TO PLANT.

Before planting a prune orchard we should know what varieties are the most profitable and always have a standard market value. The leading varieties grown in Oregon are the French (Petit), Italian, and Silver prunes. Of other varieties, such as the Hunga-

rian, Bulgarian, and German prunes, I only mention them to warn beginners to let them alone, as there is but little value in them compared to other varieties. The French is a medium-sized, oval, purple prune, with a very small pit, very sweet before and after being cured. The tree is very hardy, and as a bearer, in my opinion, stands at the head of the list of all prunes. The wood is tough, and, while the limbs may bend to the ground with their burden of fruit, it is very unusual for them to break down. Then another characteristic of the French prune is, owing to the great amount of sugar in the fruit, together with its firmness, the season for drying may be prolonged to six weeks, as decay and fermentation does not take place as readily as in prunes that contain more acid. Then, too, their beautiful amber color, if properly evaporated, makes them very attractive, and when graded to good size there is always a demand for them. I regard the French prune as being the most profitable grown on the coast. The next prune in order of value that I would indorse would be the Italian, or to use its correct name, the "Fellenberg." The fruit is larger than the French, oval in form, tapering at the ends; it is dark purple, with a dark blue bloom; the flesh is greenish yellow, sub-acid in flavor, separates freely from the stone, and in our section, Southern Oregon, ripens after the French. The tree is of a spreading habit, very hardy, very productive, fruit uniform in size, invariably thins itself when overburdened. The Fellenberg makes a much darker prune than the French, and it usually sells for from one to one and one half cents more than the French. While this prune sells for more than the French, I do not consider it as profitable as the French. The productive capacity of the French prune is greater, acre for acre, than the Fellenberg; they can be dried in less time and at less cost than the Fellenberg. The Silver prune is, as the name indicates, of light color, and is a very fine large prune when it does well. Its large size, attractive color, and sweet flavor sell it at fancy prices, but, with us in Southern Oregon, we find the tree is not hardy, it being very tender and winter-kills badly. That we may overcome this defect of the Silver prune I think is possible. The remedy Dr. A. Sharples, an enterprising and thoughtful fruit-grower of Eugene, Oregon, uses to prevent the Silver prune from winter-killing is to wrap the trunks of his Silver prunes with burlap in the fall. This he lets remain on the tree until May. The burlap protects the tree from sudden changes of the weather. That Dr. Sharples' remedy is a specific, I am a believer. In his orchard of over 1,000 trees, seven or eight years old, I did not find a tree that had winter-killed.

There may be other varieties of prunes that it would pay to grow,

but the French and Italian will, in my opinion, always take the lead, and in choosing varieties the grower will make no mistake if he lets other varieties alone.

#### CULTURE AND PRUNING.

The beginner in prune-growing should remember that his success greatly depends upon his thorough preparation of the soil and the age of the trees planted. The soil should be of good quality, well drained, and warm. Should be plowed to a depth of eighteen inches by using the sub-soil plow; use one-year-old trees from four to six feet in height. You will find one-year-old trees the cheapest to plant. Twenty by twenty feet, 108 trees to an acre, is as near as trees should be planted. It is a great mistake to plant fruit trees of any kind too close. Sunlight, air, and a superior quality of fruit and facility of cultivation is the result of plenty of room for the tree. The question of the stocking of the prune tree should be understood; it is a great error to stock them too high; fruits of all kinds should be stocked low; they are not so liable to sun scald and gum on the bark. Fifteen inches is high enough to stock prune trees. To stock prune trees at that height, cut to a bud at that height, and the remaining buds do not remove the first year. Let them all grow; they stimulate the young tree, shade the body from the sun, and materially assist in helping the young tree to become established in its new home, and recover from the shock of transplanting. The winter following, after the trees become dormant, you may take out the extra shoots that have grown on the stock, leaving such shoots at the top as will best form the head of the tree.

By the way, it should not be forgotten that energetic cultivation should follow the planting of the new orchard; weeds should not be permitted to grow, the surface soil of the orchard should be worked often, and the clods broken up. Once in ten days, in our dry climate, the orchard should be cultivated. While the young orchard, from year to year, is growing, then it should be understood is the time for the orchardist to form the heads for his young trees by intelligent pruning. The mere fact that a man may have passed through the great State of California, and possesses "cheek" and a strong hand, does not constitute him a skilled pruner, and unless he can give you an intelligent, logical reason why a tree should be pruned, and has a knowledge of the character and habits of the different kinds of fruit trees, I would not employ him. During last May I was in a number of orchards in different parts of Oregon, and I must confess that in the greater part of them the pruning was done in an indifferent manner. In many cases the object for which the orchard was planted would be defeated if the method of

pruning was continued. It is a great mistake for the pruner to shear off the top of the tree from year to year without thinning it out. What is the result of such pruning? Why, by that method you quicken and stimulate every axillary bud; you form a close, hedge-like head; you obstruct the sun, and a free circulation of air through the tree—the necessary essentials to the ripening and perfecting of the fruit. I repeat, by this bad method of pruning, the object for which the orchard was grown (choice fruit) is defeated. To lengthen the life and invigorate the prune tree, it is necessary to have it intelligently pruned each year.

After the first year's growth, when the tree becomes dormant and when it is not freezing, then is the time to form the head of your tree. The first year it is important to do the work right, as a right beginning will save you much work as the orchard grows older. The first year choose three or four of the leading branches to form the head of the tree. In choosing these branches the pruner should keep in view symmetrical proportions and equal balance of the tree. For the first four years after planting your aim should be to produce a growth of wood sufficiently stocky and strong to bear the burden of fruit of succeeding years. To accomplish this, shorten in the branches left to form the head of the tree one third. If the tree is an upright, close, compact grower, cut to an outside bud; you will then gradually spread and open the head of the tree, and give the fruit sprays room and admit the sunlight. Or, if the tree has a tendency to spread and grow downward, cut to an inside or upper bud to raise the branches. While you are pruning for wood these leading branches should be cut back annually, and such axillary growth as may be too thick, should be thinned out. The amount you cut back annually must be determined by the annual growth. If the growth was strong and rampant I would cut back the leaders about one third, so as not to cause too great a growth of lateral branches. If the growth was medium, I would cut back more, say one half, in order to stimulate more wood growth. After the tree comes into bearing, the growth becomes less, as the strength of the tree will have an additional tax in maturing the fruit. Now let us understand this fact. The prune bears its fruit on spurs produced on wood two years old and upward. On young trees these spurs are several years in the process of formation; but when they commence to bear they endure, if well managed, for many years. These fruit spurs are generally furnished with wood buds on their lower parts, and when they begin to grow feeble they can be renewed by cutting back. The skilled orchardist should notice these spurs each year, and when they become feeble, and before they perish, should be cut back. By this system of management of your

prune trees you prolong their lives, raise a superior grade of fruit and avoid the breaking down of the trees when heavily loaded.

#### GATHERING AND EVAPORATING.

The prune orchard is now five years old — the age when we expect it to become profitable, the age, too, when we must learn the best methods of gathering, evaporating, and marketing the crop. Much depends as to the value of the crop on its proper management in evaporating. By reason of our moist climate we must use the evaporator. To begin with, let us understand that no one can cure a first-class prune unless the fruit is ripe, consequently the prunes should be ripe before gathering. The French and Italian are usually shaken from the tree into canvas. The Silver is generally picked by hand, owing to its large size. Where trees are shaken it should be done gently, so that only the ripe fruit will fall. Before the prunes are scalded, they should be graded. It greatly facilitates the handling of a large crop of prunes to grade before evaporating. Prunes of different grades should not be dried on the same tray, as the smaller prunes are liable to over-dry, unless they are hand-picked, which is a loss of time and labor. After the prunes are graded, the next detail is to scald or dip the fruit. Now, the scalding or dipping process is an important detail and should be understood. We use a weak lye of one pound concentrated to sixteen gallons of water, and while scalding, the lye should be kept at a boiling point. The object of scalding is to cure the prune of its bloom, and cut the skin to facilitate evaporation. The prunes are put in a wire basket large enough to hold half a bushel, and are plunged into the boiling lye long enough so that the skin of the prune shows minute cracks; then it is taken out and washed in clean cold water to remove any lye that may adhere to the fruit. It is then placed on trays and carried to the evaporator. I know there is some prejudice against the use of lye for dipping the prune, but there is no foundation for it, for if immediately after the prunes are dipped they are thoroughly washed in clean water, no trace of lye can be found, and an analysis will verify this assertion.

Let me impress on your minds that this dipping process is a very important operation that enters into the curing of a first-class prune. When the skin of the prune shows small minute cracks it is done right. The operator should watch the dipping with care, and not scald too little or too much, as it means a superior prune if properly done with a proper evaporation which should follow. For the purpose of this paper we may assume that we have a perfect evaporator, one that dries the prunes properly, quickly, and cheaply. It would be a proper question to ask what degree of heat should be

used when we first put the prunes into the evaporator. My answer would be 150°, provided your evaporator has a perfect circulation, and without air circulation you will cook the fruit, not evaporate it. This degree of heat expels the moisture and the circulation carries it off. When the prunes are nearly cured, I then increase the heat to 180° or 200°. Finishing the fruit at a high degree of heat brings the pectine, or fruit jelly, to the surface, where it remains, giving the rich amber color which so much enhances its value. The high heat also cures the prune at the pit, or, properly speaking, changes the juices of the prune into a thick jelly, a condition in which they will keep for an indefinite time if properly boxed and kept from the moth. In coloring the prunes with high heat too much care cannot be used by the operator, so as not to burn the fruit; then again, do not over-dry; a prune does not need to be so dry as to rattle to keep; a soft, spongy prune is the prune that the market demands. There are many ways of "finishing" a prune after drying, one of which I have used to advantage when they did not present the bright appearance they should or were over-dried. They can be improved by dipping in boiling hot water for thirty seconds, using one pound of glycerine to sixteen gallons of water. This gives the prunes the glossy appearance besides the soft feel.

In regard to packing. For all first and second-grade prunes I would use 25-pound boxes; for other grades, use sacks. Then invariably stamp the brand on your boxes, if your prunes merit it; let the purchaser know who evaporated them and what State they are from.

To prune-growers of Oregon: I wish to call your attention to a few statistics on prune importation. In 1889 there was imported into the United States 43,717,353 pounds of prunes. Nevertheless, although the prune crop of 1890 had nearly doubled over the year 1889, in that year there were imported 61,905,782 pounds. These figures are all the thoughtful man requires. If they fail to teach him a lesson, anything I can say as to the necessity of looking carefully after his prune orchard would be in vain.

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## FLORA CULTURE—ITS NEEDS AND DEMANDS UPON THE STATE SOCIETY.

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A paper read by PROF. E. E. LAKE, at the July meeting, Hood River, 1892.

Horticulture has been aptly termed the poetry of agriculture. It is the refined part of that noblest employment of man, soil tillage. It has ever been held as an occupation requiring more than ordi-

nary intelligence and skill in its successful pursuits, and from the days of the first gardens to the present the horticulturist has been accorded first rank among the soil tillers, not because of his acreage, but because of his intense methods of culture and highly developed products. But in these later days, in this great age of material growth, we have been not altogether true to our best ideals of horticultural progress. As a nation, a state, a community, a family develops, it turns its attention gradually from those channels of labor that produce—first, the simple requirements of subsistence, then the plainest of luxuries, which later become apparent necessities, to the production of those things which appeal to the higher senses and gratify our better tastes. Thus it has been in horticulture. First, the production of fruits and vegetables for the better sustenance of the body became its work; later the improvement of these, as they gradually came to be considered necessities; and finally, the cultivation and development of flowers with which to regale our senses of the beautiful in form, odor, and color. Where the true horticultural spirit prevails, there will we find harmony and symmetry between and in all these phases.

That such spirit is not the prevailing condition in this Northwest today is evident from the fact that these organizations, whose self-imposed duty it is to foster horticulture, as implied in their names, devote nine tenths or even more of their energy in the development of one phase of the subject—pomology.

Horticulture proper may be divided into four coördinate branches, pomology, or fruit-growing; oleraculture, or vegetable-growing; floriculture, or flower-growing; landscape horticulture, or ornamental plant-growing, especially trees and shrubs.

It is these last and much neglected branches to which I would direct your attention briefly. Floriculture, the growing of flowers for either utilitarian or ornamental purposes, has been somewhat ignored by this Society in the past, despite one or two partial efforts to recognize its merits. Our horticulture today is not in the condition of precarious experimentation; nor are our horticulturists ignorant of the benefits to be derived from floriculture; but we have become absorbed in an eager scramble for the almighty dollar, thereby losing sight of those phases of our subject which have not given indications of immediate returns in dollars and cents. This is well, for we have been doing pioneer work. We have been manufacturing those products which were already in demand, but we are rapidly passing from this period, in fact we are entering another—a period that is calling for something more than those things which tickle the palate, for something which pleases by form, color, and odor.



The recent census of the United States shows that this branch of horticulture in its commercial aspects has reached marvelous proportions. Though the recent census was the first effort to give this industry special investigation, it has been growing rapidly during the past twenty-five years. There are now over 4,600 floral establishments in our country, valued at about \$40,000,000. They have a total glass-covered area of about 1,000 acres. They give employment to 17,000 men and 2,000 women, and last year turned out 250,000,000 plants, valued at \$25,000,000. In our State we have twenty-four floral establishments, eleven being established during the years between 1880 and 1890, and three of them managed by women. At least one of these has 15,000 feet of glass, while all told there are about 120,000 feet of glass houses. These establishments cultivate thirty-six acres of land, and are valued at \$107,000.

These figures, condensed as they are and in round numbers, give us a comprehensive view of the commercial importance of a phase of horticulture, which, so far, we have quite generally neglected as a Society.

Now, what this subject needs at our hands is a vigorous discussion, coupled with a few flower shows. The Marion County Society last year succeeded in enlisting the services of the ladies, and as a consequence made a most creditable and interesting exhibit of roses — an exhibit that awakened in more than one a desire to have more and better roses, and I have no doubt that one may see today in Salem and its vicinity evidences of the good wrought by that exhibit. One of the first steps to take is to induce some ladies or amateur florists to join with us in an effort to make this phase of the work instructive; the professional florist must be left out of this arrangement because his time and experience are worth too much to waste on the beginning. He will gladly take part later, when his own interest is at stake, as a matter of business. In one respect the course of action must be different from that followed in the past. Heretofore we have appealed to the commercial as well as the home orchardist, but now we must appeal more particularly to the lawn and window-garden gardeners, persons who are engaged in this as a work of love, not as a dollar-making matter. Our object must be to enlist the sympathy and secure the coöperation of persons having widely different aims from those already with us. We must have the wives and daughters of our present members together with what others we may secure to take the initiative. This will broaden our organization — make it in fact horticultural, while today it is chiefly pomological. This does not imply that less attention shall be given to pomology, but rather it means longer and more interesting and valuable sessions, because better attended, more widely discussed,

and of more general benefit to the horticultural workers of our commonwealth. "The bigger the show the bigger the crowd" is an adage that may be applied to our works, for certainly the more pomological, floral, and vegetable product we exhibit and discuss, the larger and more enthusiastic will be our meetings.

Not only does this phase of our subject need our attention, discussion, encouragement, and aid, but it demands, and rightly too, for the sake of our home, the intelligent, constant, and liberal support which this organization is now able to give it. The demands on our State Society are made the more urgent when we stop for a moment and consider the important relation that a pleasant home and its surroundings bears to the laborer that occupies it and the ten thousand delights which such a home gives to an only too often overworked wife and children; then, when we realize full well, as many of us must, the inestimable value of pleasant floral surroundings in the molding of young minds, in the development of a true love for Nature's handiwork in our youth, it appears impossible longer to ignore this phase of horticulture. It is said that mothers make homes and homes make nations. How important then that we have happy, cheerful mothers; and what affords them so much pleasure for a minimum outlay as flowers and shrubs.

There might be some excuse for laxity in this matter if we were residents of some of the cold and dreary sections of our great nation; but living as we do in the heart of Nature's greatest repository for flowers, we are guilty, morally at least, of criminal negligence so long as we neglect doing our full duty in this matter. Criminal negligence—because crime is always less where there is an abundance of trees, shrubs, flowers, and fruits; for, however seared by crime the heart of man, he never yet has been so base as to be unaffected by the delightful odors, pure colors, and exquisite forms of Nature's highest handiwork—flowers.

A feature of this matter is the fact that our native flora abounds in trees, shrubs, and herbs unequalled for decorative purposes. While there are in this State several establishments equipped at great cost for the propagation of introduced plants, there is only one, so far as we know, where the floral beauties of our own section are being propagated, studied, improved, and cared for. Even the humblest need not be without an abundance of the choicest flowers and shrubs, provided they have the health and strength to go out into fields and forests and collect them, yet it is the fashion of the humble to ape the rich, and while we may find scores of homes where a few choice roses, geraniums, fuchsias, ivys, etc., are struggling along with half care, not one will be found with our native syringas, spiræas, ceanothus, lilies, brodiaeas, mouse-ears, Oregon grape, and others equally

desirable that will do well with no care, and splendidly with any reasonable care.

The history of our society during the past two years will warrant the assertion that if this matter were taken hold of, and it must be, success will follow, the organization will be broadened and better prepared to perform the great work it presumes to of developing the horticultural resources of Oregon.

By way of suggestion, we might say that a few liberal rewards for collections of wild plants, growing in garden or lawn, as well as substantial awards for choice and individual plants of indigenous or introduced species, together with premiums for herbaria and growing collections by young people, would do much to arouse active interest in the development of a field that will ultimately add much to the wealth of our State's horticulture. In a paper of this length we cannot outline a complete course of action, but sufficient has been said, we trust, to render some aid in inaugurating a work, the benefits of which we today can only surmise, but which will surely be fraught with the happiest results for the future.

If, in these few rambling remarks, we have said anything that will tend to develop this much neglected phase of horticulture in our commonwealth, and stir the State Society into something more than harmful inactivity, we shall feel well repaid for our only too insignificant efforts.

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## IS SPRAYING BENEFICIAL?

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By E. P. SMITH.

The subject of spraying, though one of vast importance to our fruit interests, is one that is little understood by the average farmer and fruit-grower of this State. Oregon has been free from noxious insects so long that most of the fruit raisers know very little about the presence of foes injurious to clean, choice fruit. With some of these the spray pump is a nuisance, and a machine to be let alone; but with others who see the profit to be made in the culture of fruit, and still others who grow fruit for the mere pleasure of watching Nature's choicest gifts expand, develop, and mature, the spray pump has come to stay, and stay for good. They see the importance of keeping their trees and fruit free from disease and injurious insects from a pecuniary point of view, as every dollar invested in a spray pump and material will be repaid tenfold in the increased production of their trees and the immunity of their fruit from scab and worms.

My experience has been a happy confirmation of the above, for what little I have expended in outlay has been more than returned in increased production and growth of trees. It has been long and tedious waiting, but the end has justified all my expectations. I commenced operations some two years ago by buying a Climax spray pump. My first spraying was done in February, 1890, using Babbitt's concentrated lye, one pound to five gallons of water, and drenching the trees thoroughly with the same. This killed all the moss, and caused all the old, dried, scaly bark to drop off. This, though it killed all living insects and parasitic fungi, was not strong enough to destroy the eggs of the Green Aphis. A stronger solution was not used at the time on account of the swelling buds. To do good execution a mixture of one pound of lye to two and one half gallons of water should be used, and the trees sprayed when entirely dormant. This was done on my trees last winter and was entirely satisfactory. I have also used the kerosene emulsion, applying as soon as the Aphis began to hatch out; sprayed on at intervals of about three weeks for three months. It has not cleaned the orchard on account of lice flying in from neighboring orchards, but has disposed of many. Spraying the last of August caused all the Aphides to migrate from the older orchards to a young and adjoining one. Further experiment this year will demonstrate whether or not spraying in August will cause them to leave for a certainty. While I did not kill all the Aphis in the August spraying, there were no lice on the old trees a month later, while they increased perceptibly on the younger orchard.

I hear some complaint about the kerosene not mixing with the water with some parties, but I have had no trouble so far. Following is the formula I use: Two pounds common or whale oil soap, two gallons kerosene. Boil the soap in one gallon of water until dissolved, then add while boiling hot to the kerosene; churn by means of a force pump for ten minutes. This, if perfect, forms a thick, yellow, creamy mass which will thoroughly mix with water. Dilute with water to make thirty gallons. This, in my experience, is certain death to both the Green and Woolly Aphis if sprayed on thoroughly and often, say once a week in the early season. For the Woolly Aphis, in addition to spraying the top of the tree, I pour about two or three gallons of the emulsion around the roots.

The importance of thorough, honest work in the orchard cannot be dwelt on too forcibly, as upon thoroughness depends the success of the venture. In this, as in all branches of business, is this word the secret of success. No man will succeed unless he puts his whole soul and mind into the business he is bent upon following, and no matter whether he is the greatest mechanical genius that has ever

lived, or simply a poor plow-boy, his aim should be to be thorough and follow this rule to the very end. "If a thing is worth doing at all it is worth doing the best that one knows how."

Mr. E. J. Haines, of Lafayette, sends description of a cherry originating with Mr. George Knapp near that place, and introduced by E. R. Poppleton about six years ago. Shape, round; medium size; color, black; quality, good for canning. Tree very thrifty grower and hardy.

Dr. J. B. Pilkington, of Portland, sends description of the Nellie Noyes peach, for which he has paid the sum of \$100 for the right to propagate. This is a seedling found growing in the garden of Captain Noyes, of Portland, about four years ago, and named after his daughter. Fruit very large, some measuring ten inches in circumference. Color, yellow and carmine; quality, good; blooms very late, and ripens late in September; bears very regularly and is prolific; clingstone.

Mr. H. P. Walker, of Milwaukie, has a seedling prune which has been bearing on his place for several years. It will average larger in size than the Fellenberg; is very dark colored; have seen and tasted the dried fruit, and think it is in every way as good as the Fellenberg. He sent specimens to California, and fruit men there pronounce it very fine. The tree is a very free grower; dark colored wood, resembling peach plum in growth; is a very regular and prolific bearer, and will be one of our most valuable fruits for drying.

I have a seedling peach that fruited last season (1890), which resembles the Early Crawford, but ripens after the Crawford is gone. Tree, very thrifty; has had no care, but has borne heavily. I have another seedling peach that also fruited last season for the first time; had but few specimens, but they were very large and showy, being white, with heavy dark red cheeks; ripens after Early Crawford; freestone.

Mr. H. W. Prettyman also has a clingstone, which he calls Prettyman; is very large and one of the finest in the market; fruit sold this season at highest price.

I have received reports from several other parties, who have or know of new fruits; but as they sent no descriptions, I cannot place them intelligently in the report.

In making this hasty and imperfect report, I hope a beginning has been made that will stimulate the fruit-growers in propagating new varieties and adding to our list of valuable seedlings.

## YELLOW S IN PEACH TREES.

The Department of Agriculture has just put forth a pamphlet devoted to the subject of "Peach Yellows," showing the deadly nature of the disease, also its communicability and the consequences of its introduction to any peach-growing region.

Facts are given concerning the destruction of orchards in peach-growing regions, all over the Eastern States and as far south as Georgia and north to Michigan.

The Yellows is very insidious and always deadly. It does not exist in other countries, but had its origin on the Atlantic seaboard. Inquiry made in Europe shows no trace of its existence there, and our country has an unfortunate monopoly, so far, of its existence. No doubt it is transmitted by communication, and transfers of seeds, trees, and scions from one section to another, and by this means has become planted on our coast. It is unsafe, therefore, for any one to import seeds, plants, or cuttings, without perfect proof that this terrible disease does not exist where they are ordered from. If we have a few cases of yellows, it may be possible to destroy all infected trees and stamp out the malady before it spreads too far; but it is not safe to leave a tree in the near vicinity, or to plant a similar tree where the diseased one stood.

Whole orchards have been destroyed where the Yellows have prevailed, and it is as much dreaded by Eastern fruit-growers as would be a pestilence. Whole orchards and whole peach-bearing districts in Delaware, Maryland, Virginia, Georgia, and Michigan have disappeared before the march of Yellows, and men who considered themselves great fruit-growers have found their occupation gone. Under these circumstances, the people of the Occident have need of the greatest caution and prudence, to be exercised by themselves individually, and by the Horticultural Commission of our State, to prevent the bringing of this disease into our region. Imagine what it must be to Eastern peach-growers to have their trees ruined and their prospects for income destroyed. It is not easy to exaggerate the danger, and it only remains to be seen what means can be used as a preventive.

The Yellows makes a very gradual progress, for a tree languishes and finally dies after three years' decline. It has very singular characteristics; at first a tree and its leaves and fruit show a sickly, yellow color; year by year the leaves grow thinner and narrower; fruit dwindles; a multitude of buds and sprouts form and grow

in a small and sickly way; and finally a dead tree stands where once was a sturdy, vigorous, and prolific bearing one that was good to look at.

It is not possible to give a full estimate in this issue, as the pamphlet requires closer study than we have time to render now, but it will be worth while in the near future to cover the ground completely, and show what is best to do to guard against its coming to our State, and how to do best what can be done. As yet no opinion can be formed as to its origin and character. We only know of its dangerous quality.—*Fruits and Flowers.*

## VEGETABLE GROWING.

A paper read by JOHN HENRY, of Beaverton, at the January meeting, 1892.

In 1891, the yield of our vegetable crops may be described as fair; but prices have been rather low, in consequence of the increased acreage, due to the high prices that have prevailed for two years.

Potatoes and onions are the principal vegetables grown for export, and the onions are mainly produced on the beaver lands of Washington County. The average yield is about 500 bushels per acre; and during the last fifteen years prices have ranged from nothing up to eight cents per pound.

There are no novelties to report in onions, because none are grown except the acclimated, or Oregon Yellow. Improved modes of culture are discovered and adopted slowly, but in the last fifteen years a decided advance has been made in onion growing. Formerly the ground was raked by hand,—a tedious and expensive practice when ten or fifteen acres were to be gone over; now the ground is smoothed by horse labor at less than one twentieth of the cost. Formerly the tops were cut off in the fall before storing the crop; now that practice is completely discarded, because it was discovered that the onions kept much better with the tops on. The latest improvement is thinning the crop when young to obtain larger bulbs. The enemies of the crop are the maggot, cut-worm, aphid, and mildew. In growing onion seed the only enemy that has yet appeared is mildew, and its presence or absence, other things being equal, makes the difference between a good, bad, or indifferent crop. The yield of seed ranges from five to twelve per cent of the weight of the bulbs planted.

There is an inviting prospect for the right man in the right place to go into the business of growing onion sets. Thousands of dollars

are sent out of Oregon annually for an article that can be produced at home.

A mode of irrigation is used by a few farmers on the beaver land in Washington County, which is so simple and satisfactory that it should be more widely known. These lands have a stream of water all summer flowing in a large ditch, and into this ditch underdrains are made to dry the land early in spring. In summer, if the land becomes too dry, the water in the ditch is raised by constructing a dam, and thus made to flow backward, up the underdrains; the underdrains thus serve a double purpose—they drain the land in spring and irrigate it in summer.

Commercial fertilizers are now coming into use. Among the kinds that are or are likely to be offered for sale in Portland may be named bone meal, acid phosphate, nitrate of soda, Mexican guano, fish guano, and kainit or German potash salts. It is likely that these articles will soon be extensively used by market gardeners and by men who grow costly crops like hops, onions, seeds, roots, etc., but many and careful experiments will be needed to determine which article or articles, what quantity, and what soil and crop to apply them to; but before these experiments can be made with confidence in the result, we must be sure that the articles contain the essential ingredients that they claim to contain, and this can be ascertained only by chemical analysis, which the buyer usually cannot make, and therefore he has no protection against fraud, for, though after the fertilizer is bought he may send a sample to the Experiment Station and have it analyzed free of charge, the plans would be tedious and seldom resorted to.

Eastern States have laws to prevent deception in the sale of commercial fertilizers and requiring them to be sold by the percentage of nitrogen, phosphoric acid, and potash they contain, and it is time we had a similar law in Oregon, and to this matter we earnestly invite the attention of the committee on legislation.

In the use of costly commercial fertilizers it is a part of good practice to ascertain what elements of plant food, if any, the soil does not need, and for this purpose a number of careful experiments were conducted on the farm of a member of this committee, with the result that on loam the crops were always increased by nitrogen and phosphoric acid, and not increased by potash; while on peat soil it is just the reverse—the crops are increased by potash, and not by the other two. The lesson is, and it is a valuable one, that it would be a waste of money to buy potash for the uplands, or superphosphate for the beaver land.

It is known that on the beaver land a good crop of onions will not follow a crop of beets or cabbage unless manure is used, and



from these experiments the inference is drawn that the cabbage and beet extract so much potash that not enough is left available for the succeeding onion crop.

It is also known that on peat soil that has been cropped till it is so poor that peas will not form, the vines will grow and the pods will grow, but they will not fill.

Cabbages will not keep through the warm, damp winters of the Willamette Valley, and during about four months of the year we are dependent on outside sources for our supply; it is, therefore, desirable that an effort be made to produce a variety that will keep till May, or later. This has been done with the onion, and whoever does it with the cabbage will confer a boon on the State, and we deem this matter well worth the attention of our Experiment Station.

Among the small fruits growing wild in Western Oregon is a kind of huckleberry, which, if cultivated and improved by selection, we think would be a valuable addition to the list. It makes a delicious preserve, and we recommend it to the committee on small fruits.

In closing, we will remark that in the vegetable department of horticulture, in studying crops, in trying experiments, in underdraining, in irrigating, in subsoiling, and in producing labor-saving contrivances, there is ample scope for the best effort of all who are willing to work with head and hand.

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## ALMOND GROWING IN SOUTHERN OREGON.

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Read by A. H. CARSON, of Grants Pass, at the Farmers' Institute at Medford.

In choosing to read a paper before this institute on the subject of almond growing, it would be right for me to explain what I conceive the necessity for it.

After a residence of eighteen years in this part of the State, and during that time I claim to have been a close student of all matters pertaining to pomology, I have often wondered why the beautiful, healthy, and vigorous almond trees growing in the gardens of Jackson and Josephine Counties were such shy bearers. I know that some said it was because the almond bloomed so early in the spring that the crop always was injured by frost, and for awhile I took this explanation as conclusive, until personal study and observation taught me that this was an error.

I noticed that when the peach crop was not injured by spring frosts neither was the almond crop, nevertheless the almond invari-

ably was a very shy bearer, and with seasons of no frost the almond was, as usual, without fruit, or at least a very little, excepting in isolated cases. Our California neighbors were growing the almond, and successfully, too. The question occurred to me: Was the difficulty on account of our soil and climate? On investigation I found the soil and climate of Southern Oregon was all that could be asked for, so far as growing the almond was concerned; that our lack of success was for the reason that we did not have the right varieties; that the varieties we are trying to grow here would give no better results in California than in Oregon. That the varieties we are trying to grow here are deficient in pollen, or in other words, the flowers of nearly all the almond trees grown here in Southern Oregon are pistillate flowers, or if the flowers have stamens they are so defective that they do not fertilize the pistils, or if there is a fertilization it is very imperfect, and the result is the fruit prematurely falls off.

As a matter of course, you all understand the object of the flower in the fruit tree, or any plant, is the production of seeds, and through it the reproduction of new plants. The essential parts of the flowers are the stamens and pistils. Now, my examination of nearly all of the flowers of the almond I have examined in my vicinity has resulted as follows: I find that the most of the flowers are staminate; but in nearly all cases I find the stamens, or anthers, are deficient in pollen, and fertilization does not take place. The fact of finding this to be the case resulted in my corresponding with successful almond growers in California, and from them I have learned they, too, have experienced the same difficulty at the beginning of their almond growing that we are undergoing; and their success now is from the fact that they plant alternate rows of almond trees in their orchards of different varieties, one of which is known as staminate and very prolific in pollen.

The cultivation of the almond is the same as the peach. The soil also should be the same as for the growth of the peach, *i. e.*; dry, loamy soil, not less than eighteen inches in depth, the greater the depth the better. While the almond is closely allied to the peach, and considered as belonging to the same family, still its characteristics, so far as growth or the formation of fruit buds are concerned, are different. The almond usually forms the greater part of its fruit buds on wood of the second year's growth. The fruit buds are usually compound, and form in a similar manner to fruit spurs on the plum.

Therefore, in pruning, the intelligent pruner of the almond should keep symmetrical proportion in view, together with thinning out of branches to admit sunlight, etc. As a profitable crop

to the orchardist, perhaps there is no crop grown where there is so little loss. It is not perishable, and after gathering, the only manipulation required is the bleaching of the nuts by sulphur fumes to give them a bright, attractive color. The almond begins to bear at three years old, and becomes profitable to the grower at five years old. At that age, cultivated properly, it should give the producer twenty pounds of marketable nuts to the tree. One hundred and eight trees to the acre would give a yield of 2,160 pounds to the acre; quoted at this day at 12 cents for soft shell, equal to \$259.20 gross per acre. As the almond is a long-lived tree, what its maximum product is under favorable cultivation, we can only approximate.

## SOME THOUGHTS ON HORTICULTURE.

Read by A. ROGERS, of Forest Grove, at Portland meeting, January 12, 1892.

It was well said that,

“The groves were God’s first temples,  
Ere man learned to hew the shaft or lay the architrave.”

And the groves are yet God’s temples. Who that walks in the shade of a beautiful forest does not feel with Emerson that, “A nicely found tree is a fine expression of God’s thought.” Let such a man turn from his instinctive veneration for a green tree—for a grove, to the study of the lesson which every tree contains, and if he learns his lesson well he will thereby be made the wiser and better.

It is said that the acorn contains the perfect embryo tree, and with it the life impulse that nourishes it until it can send its roots into the ground for water, and the nourishing elements which it holds in solution, and its sprout up into the free air of heaven for the food contained in the sunshine ray that has come to the earth freighted with the best delicacies of the universe.

But the tree started is not yet a monarch of the forest, or the glory of the orchard, and ere it can be such it must endure much opposition and not a little severe discipline. But armed with life instinct—and why not apply the word instinct to a tree as well as an animal—it sends out roots in every direction to brace and sustain the growing body; and if the gentle zephyrs of the south are more than gentle, and the sea breeze comes east on a bender, it sends its anchor roots down into the earth as the yachtman drops the centerboard into the sea, and sending life-giving sap into its masts and spars above, virtually says, unfurl your green sails to the gale and speed on your mighty growth.

The poets have long sung of the beauty of the primeval forest, but they have never told us how necessarily severe the discipline of Nature's school has been in the processes of pruning by fire and storm, and the wholesale slaughter of the weak and crippled, so that after all the monarchs of the forest that command our admiration are a standing exhibition of "the survival of the fittest." But unaided Nature does not reach the symmetry and beauty which a copartnership between Nature's power and man's ingenuity can accomplish. Man, the crowning work of creation, finds things but half ready for his use. The tree in the forest, the iron in the mine, the lime in the quarry, the glass in the sand, must be brought forth from their hiding places and molded into such shape and condition that he can use them in building the home for the protection and comfort of his loved ones; and so a tree, beautiful where it has grown under favorable circumstances, is ordinarily but half what it might have been if an interested and horticulturally wise man had watched over it.

Nature has wisely planned that man shall exercise both mind and muscle if he obtains the best things in her storehouse. Some have come to our loved Oregon because here Nature does so much more than elsewhere. Many can secure a good living and *rest* more than half the year. But the man who sits by his fireside to wait for the growth of his grain or fruit will find that unaided Nature does but half her possible work in flinty New England or the Willamette Valley. Here apple trees will grow in the midst of the forest, if by chance the seed may have been dropped in a favorable place, and the fruit trees will bend beneath their burdens in neglected orchards, yet we ought to remember that under such circumstances they cannot do their best work.

The horticulturist is always interested in the best trees and the best fruit that can be produced, and, of course, we think he is entitled to the very best of everything in this line, but he can only come into possession of his rich Oregon inheritance by earnest study and faithful labor. A man is unworthy the name of *horticulturist* if he is not willing to coöperate with Nature for the best results.

An Irishman, fresh from his native land, entered the office of a business man and asked him if he was in need of help. The man smiled and replied, "I do not have much to do, sir." "Arrah," said Pat, "its little I keer about doing, *it's the money I'm after getting.*" Many a man starts an orchard with Pat's thought in his mind, and finds ere long that even in fruit-growing there is no excellence without great labor. If he has a favorable location and his trees grow nicely, the Woolly Aphis or Codling Moth take possession without a warranty deed and defy the ordinary requests to vacate. Nor

are these pests without their value in the world. They compel labor as well as study, and give a man of brains and energy the chance to win his way to a good success. A great moral philosopher, who was discoursing on the "moral uses of dark things," was asked for the use a mosquito could be put to, and his reply was, "To make the unbathed man scratch." Some of the fruit pests may make us *scratch* in the effort to control them, but there may be a value in the knowledge how it can be done and in the effort to do it. That these pests are here in multiplying abundance we are compelled to admit, but a real man does not submit to the rule of any tyrant, great or small.

It is your mission, gentlemen, to point out the enemy, show us the implements of war, and call us into line of battle. It is not pleasant to feel compelled to enforce a necessary law against one's neighbors, but everything that can be called a nuisance ought to be abated, and if your next neighbor sees you putting forth intelligent efforts to save your fruit by fighting the common enemy and allows his orchard to become pest-ridden, what can we call it but a *nuisance*. We must insist through the press, in public speeches, in conversation, and if need be by the strong arm of the law, that imported pests that menace our fruit crops shall be exterminated, and that Oregon, the best fruit country in the United States, shall be developed, and take her proud rank in the sisterhood according to her special productions of grain and fruit.

When our resources are fully known and our matchless climate appreciated by our frozen and scorched people of the East, beautiful Oregon will become much more beautiful under the subduing hand of the intelligent farmer and horticulturist.

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## OREGON'S FUTURE IN FRUITS.

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Paper read by E. H. SKINNER, of Newberg, at the January meeting, 1892.

Many of you have read the book entitled "Looking Backward." I will commence by looking back to childhood, fifty years ago. I well remember the first fruit buyer that came into Steuben County, New York, after the Erie railroad was completed. None had ever been there before. This fruit buyer came into my father's orchard and bought his best apples, paying \$1 per barrel, the agent furnishing the barrels, and my father was to deliver the apples to the railroad fifteen miles distant. This price, \$1 per barrel, seemed wonder-

ful in those days, as there had been no market up to that time. When we were gathering the fruit, my father said:

"If I thought I could always get such a price for my apples, I would set out fifty acres."

He had his doubts, so never set out the orchard; time rolled on; fruit never was lower, and often brought \$3 and \$4, and many times \$5 a barrel.

After I became of age I moved to Illinois and planted an orchard. While doing so, many old men told me that I was overdoing it, and by the time my orchard came into bearing apples would not be worth 10 cents a bushel, as everybody had gone crazy on tree planting. What was the result? I never sold one single barrel in the late spring for less than \$3 per barrel, and twenty years after planting this orchard I sold my entire crop of No. 1 assorted apples to one shipper for \$3.50 per barrel.

Time still rolls on, and you hear the same remarks, "The fruit business is surely going to be overdone." Now, gentlemen, this is simply nonsense. Raising culls will not pay any longer, but raising good A No. 1 fruit will pay better today than it did thirty years ago. When I planted my first acre of Wilson strawberries I had hard work to sell them at 10 cents a quart. Twenty years after that I often had ten acres of berries and found ready sale, and that, too, in the same city where I glutted the market with my first acre.

The inhabitants of the whole world are becoming fruit-eaters; but a very small number can be fruit-growers. Take your map and follow me over the inhabitable portion of our globe, and tell me what portion can grow even our hardy apples. Not one hundredth part. Now take the prune. Not one acre in ten thousand can grow it at all, and nowhere better, if equal, to this coast. We must not here in Oregon expect to compete with California until we have planted every hillside. We cannot command a market with so small a quantity of green fruits as we now grow. Tell me where a train can be loaded daily in this part of our State, or even a single car.

Now throw aside this idea of over-production, and go to planting good orchards with good trees; then take good care of them; cultivate often; take your hoe and thank God you have the strength to use it; hoe your trees once, twice, three—yes, four times, if needed, but remember, don't return thanks sitting on the fence, as the prayers of a lazy horticulturist will only be answered with Codlin Moth and windfalls.

## NOTES AND QUESTIONS ON GRAPE CULTURE.

A paper read by MR. J. H. REMSE, of Newberg, at the October meeting, 1892.

One of the early pioneers of Western Asia, who was largely engaged in horticulture, chiefly for home trade, was Adam, and who would consider an illustration of his gardens properly drawn without showing an abundance of vines laden with choicest grapes?

History does not tell of a time when the more progressive nations of the world did not make grape-growing a leading occupation. Temples and shrines of all ages have been embellished with this token of blessing; and we deem it but proper to call the attention of the horticulturists of Oregon to this most excellent, though with us, much neglected fruit.

We believe it to be a part of economy to produce at home, as nearly as may be, everything we consume; and if we of Oregon can supplant the imported grapes with a home product, it will save many thousands annually to our State.

The vine is indigenous in a very large section of country, and varies much in habits, appearance, and quality of fruit from the Concord, Scuppernong, and many other leading native varieties, down to the meanest grape that ever betrayed the tooth of man; and it has been claimed that where no wild grapes are found, cultivated ones will not flourish. This saw, however, cuts Oregon out of the business, since there are no wild vines excepting a stunted, shrubby variety of *Californica* in our most southern borders.

With our present shipping facilities, fruit may be carried long distances at small expense, and the grape being so much influenced, restricted, and developed by climatic conditions, it were folly to attempt its cultivation on a large scale, where it will only indifferently succeed; yet this is a fruit which must ripen where it grew, or not at all; grapes plucked unripe from the vine will remain unripe until they decay; and whatever may be said of imported grapes sold elsewhere, we are bold to say there has never been a pound of really edible ones sold here.

While fruit is usually judged by the looks, there are a few people who know good fruit by the taste; and we are firmly of the opinion that the latter class will always take a good home production in preference to an insipid though showy imported one; and we further believe we can and ought to produce more, very many more, of the choicest varieties.

I do not hold that we should all undertake this business for profit.

but while there are not nearly half the homes which contain one single vine, every poor, down-trodden farmer in the land might just as well make glad the hearts of his family with an abundant supply of the fruit of the vine.

To succeed with grapes we should have a warm climate, an average of not less than 55° for April, May, and June, and 65° for July, August, and September, with not too great a rainfall during the former months, and the less the better during the latter.

These positively essential conditions we may usually claim, yet the great variation of temperature, the very cool nights which we have throughout the summer, we believe to be somewhat detrimental to grape-growing here.

The soil should be warm, porous, and well drained.

Varieties are so numerous that to test all would require a very large vineyard; yet their habits are so varied that no one locality will produce but comparatively few equally well; so we must look to our practical grape-growers for advice as to kinds which succeed best with them, and not expect every new variety which has done well a thousand miles away to be a success here.

In this locality, the Concord, Delaware, Coloma, Eumelau, Pocklington, Salem, Miles, etc., are doing well, and from this list an ample assortment may be made.

Having selected your climate, your soil, and your varieties, procure healthy vines one or two years old, plant about eight feet apart each way, just in the same manner you should plant a fruit tree; cut back to two eyes, allowing the stronger one only to grow, and cultivate as you would a garden.

Pruning should invariably be done in the autumn or winter. After the first year's growth cut back again to two eyes. If it is desired to train in upright form, allow only the stronger to grow, which should be kept neatly tied up to a stake. In the fall, head in somewhat as you would an apple tree, cutting back the laterals to two eyes each; and every subsequent year, after properly thinning out the laterals, cut back the remaining ones as before. This method allows free cultivation both ways, is thought by its adherents to produce finer fruit, and is much practiced by grape-growers of the Pacific Coast. If trellises are preferred, allow two canes to grow the second year, pinch back when four feet long, and in the autumn cut the laterals back to from two to six eyes. It is also desirable with some varieties to grow new canes each year to bear the succeeding year's crop, while the more vigorous growers fruit better on spurs from the old wood.

Whatever the method of pruning, each eye will produce a shoot which should bear two, three, or four clusters, with a leaf opposite



each. These shoots should be pinched just beyond the last bunch of bloom, as soon as this may be done, and in turn the forced laterals from the buds should be pinched to one leaf. All suckers from base of vine, and all weak, barren shoots should be removed.

As to diseases of the grape, the mildew is the most common and hard to combat. Flower of sulphur, long in vogue as a remedy, is not now countenanced by best authority. Happily our climate is not favorable to the development of this disease, and we believe there are plenty of very good American varieties which will here be exempt from it. The *Viniferæ* are much more subject to this disease than the American grapes.

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## SUGGESTIONS TO AMATEUR FLORISTS.

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A paper read by MISS MAGGIE INGLES, of Newberg, at the October meeting, 1892.

“Consider the lilies, how they grow, they toil not, neither do they spin.” We understand that our horticulturists have come to the conclusion that they are neglecting to “consider the lilies,” and are wanting the sisters to help them a little on that line. In offering these suggestions, I would say that they are given from a Western Oregon point of view, as climatic conditions are so different in the eastern and southern parts of the State from this part that different varieties and different treatment is required to a considerable extent. As upon entering a home the first thing which usually attracts our attention is the lawn, we will first consider out-door flowers.

In planning a flower garden, the location, exposure, size of lawn, etc., must first be taken into consideration, and after studying the best effects from these standpoints, work systematically and carry out your plans. Do not have your design too stiff and prim, as the effect will not be so pleasing as if there were a little irregularity. Let it appear as if nature had broken in upon art's decree here and there. Considering shrubs first, if your yard is large enough to admit, have a good many of them, especially taking care to select some with handsome foliage, so that when their blooming season is past they will still look well; and have some of the evergreen varieties. Do not crowd your shrubs, though an occasional clump of several of the same kind near together would look natural.

You can hardly have too many roses—the “queen of flowers.” There are so many beautiful ones that it is difficult to choose from among them, but it is well to get a number of the standard varieties, old and tried kinds, such as La France, Jacqueminot, Papa Gautier,

Plantier, Prairie Queen, and the old sweet pink monthly rose, which gives us a wealth of bloom all summer and fall, and others which have proved to be of easy cultivation and hardy; then, if you can afford it, and have room, just as many of the teas and less hardy sorts which do well here with a little protection—just as many as possible of these.

Teas and smaller sorts of roses are most effective planted in beds, but for the strong growing varieties planted singly as a shrub, a "clump" of roses growing at their "own sweet will," is a "thing of beauty," and gives a home-like look to a place. Roses require a rich soil, old chip dirt being a favorite with them, and to do well here, in the dry part of the summer, particularly the small kinds must (let me emphasize this) be watered frequently, and I think a good mulch of some sort would serve to retain the moisture around their roots.

Again, let me say, have as many shrubs and bushy plants as your grounds will admit of, because in our long dry seasons our yards—where we do not have water privileges—get so dry and bare looking if we do not have a good many leafy shrubs to relieve them; and for the same reason would suggest planting kinds that will retain their foliage in good condition in the foreground or conspicuous parts of the yard, and for annuals, "spring beauties," etc., which are indispensable in their season, but whose dry stems and shriveled leaves are but relics of former glory during our dry summer; for these I would have beds in nooks and corners that are somewhat out of the way. Gladiolas and cannas are lovely summer-blooming flowers, and zinneas and China asters make bright spots in the dry season, the asters being veritable bouquets by themselves. Dahlias are a necessity and can be as easily grown as potatoes; and last in the season comes the rival of the roses, chrysanthemums,—have as many of these as possible, for they will re-pay your care with a profusion of blooms, and such lovely blooms, often until Christmas. As regards soil and treatment of the various flowers, one cannot do better than to study the catalogues sent out by florists, making such changes as may seem advisable considering the peculiarities of our climate.

Concerning house plants, the most common and easily grown varieties are geraniums, and of these there are a multitude of varieties. Again, I would advise an amateur to be cautious in selecting novelties; first, get standard varieties, and if you have no other means of knowing what these are consult several catalogues, and you will find names of best kinds running through them all, while the novelties are usually "boomed" by the originator in his own catalogue.

For geraniums any good, rich soil, made friable by about one third leaf mold and a little sand will do well, and the same will do well for begonias, being sure to have good drainage in the pots, as otherwise the roots will decay, and in the summer giving plenty of water, once a day at least; in winter once a week sufficing, unless plants are kept in a warm, dry room. Stir top soil in pots often to prevent baking on the top, in which case water seeps down the sides of the pot and often does not reach the roots. Re-pot your plants once a year, early spring being the best time, and change from smaller to larger pots as the plants grow. Geraniums, fuchsias, and a number of other kinds bloom best when a little pot-bound. For fuchsias I would have at least two thirds leaf mold in the soil, and be sure to keep them very moist; drought will cause them to drop their heads. In regard to begonias, I would advise that the Rex varieties be left out of the collection unless one has a greenhouse, as they do not do well in a temperature of less than 60°, and are not very satisfactory under common conditions. Try some of the new tuberous rooted begonias as they are lovely both in flower and foliage. Be sure to have some Calla lilies, giving them plenty of water, and you will be rewarded with their handsome, tropical-looking foliage and their lovely white cups. Calladiums are fine for effective foliage and require similar treatment to the Calla. The Abutilon is a handsome shrub with its lovely bell of bloom, and an Oleander is also desirable. For a low, bushy plant the Hydrangea is among the best. In your collection do not fail to have some vines and hanging baskets, and in your sitting room nothing will look prettier than a box of ferns,—go to the woods in the early spring for them, and bring soil from where they grow along with them, plant them carefully, and cover the soil with moss, give them plenty of water, and in the hot summer days a glance at their cool, green fronds will lower your temperature immediately. Another class of plants to which I would especially direct your attention just now, as this is the time for planting them, is bulbs.

Personally I have not had much experience with them, but as they are coming into such prominence, I will quote from an article by Eben E. Rexford, one of our best floral writers:

“Plant early, though they will do well planted as late as the last of November; let your location for bulbs be a well drained one; if not so naturally, make it so by removing the soil to the depth of a foot or a foot and a half, and fill in the bottom with old rubbish, which will keep the soil which you return from settling into a compact mass, as before its removal. When you throw back the soil mix with it old manure and stir until mellow. Plant such bulbs

as tulips and hyacinths about four inches deep, smaller ones not so deep, and about five inches apart. Plant each kind by itself, as the effect is better than where several kinds are mixed in the same bed. Small bulbs, crocuses, snowdrops, etc., plant here and there among the grass."

I have not space to quote further, but would say to the ladies plant right away a large tulip bed; then next spring, after they have done blooming, leave the bulbs in the ground to mature, and between them set out geraniums, and have a lovely bed all summer. If you have not enough geraniums, root a lot of slips this fall and they will be ready for planting in the spring.

We might mention many other kinds of flowers, but by the time our novice has learned to grow these well, he will then know for himself just what he wants.

## HORTICULTURE IN EARLY DAYS.

Read by Oregon's veteran nurseryman, SETH LEWELLING, at the October meeting, 1892.

I have been asked for a paper on this subject, and promised to tell what I remember. My friends, I trust you will excuse what may seem to be a very frequent use of the first person singular, because of the reminiscent character of the subject allotted to me.

Horticulture in Oregon began in Salem, Henry County, Iowa, in March, 1847, when my brother, Henderson Lewelling, planted an assortment of the principal fruits—apples, pears, peaches, plums, and cherries—loaded them into two wagons, and started with them across the plains to Oregon. He also planted a few black walnuts and shell-bark hickorynuts, which sprouted and came up on the way. At our next meeting I hope to present the Society with a gavel made from the wood of one of those historic hickories, which lately fell a victim to progress because it happened to be in the path of the East Side Electric Railway Company's line from Portland to Oregon City.

My hearers can imagine the labor of watering and caring for that nursery through that long wagon journey, from March to November, when it arrived at Milwaukie. He succeeded in bringing a single Isabella grape. He transplanted his nursery almost immediately from the boxes to the land now owned by J. H. Lambert, between Milwaukie and Sellwood, what was then the Meek donation claim.

These, I believe, were the first domestic fruit trees brought to this coast, except, perhaps, such citrus fruits as may have been intro-

duced in California by the Mission fathers. So highly were they appreciated that offers of \$3 per tree were freely made when they arrived.

About this time my brother and William Meek formed a partnership in the business, but from the fall of 1848 to 1850 they sold very few trees. The great difficulty was to get stocks on which to graft. They tried the wild crabapple and thorn bush for seed fruits, and the wild cherry for stone fruits, but with poor success.

In the fall of 1849 a Mr. Pugh brought from the States some seed of various kinds, which Meek & Lewelling bought and planted, and from which in the fall of 1850 they had splendid stocks from two to four feet high. They grafted 18,000, which in the fall of 1851 averaged about four feet. The land on which this first really successful nursery was grown adjoins one of my orchards, and is now owned by Richard Scott and used for pasture. It was irrigated, and you may easily believe very carefully cultivated.

The apple trees sold readily for \$1 apiece, and plum, cherry, pear, and peach for \$1.50 each. In the fall of 1850 I arrived at Milwaukie, bringing with me quite a lot of fruit seed. From that time we had stocks for grafting, though not in great abundance. We still used the wild cherry, and in the winter of 1852 we pulled a great many wild cherry trees, my last day's work at it being 3,000 trees, which brought me a felon and rest from tree pulling.

In 1853 Meek, my brother, and myself started branch nurseries, one at Salem, in charge of Alfred Stanton; one in Polk County, back of Spring Valley, in charge of Amos Harvey; another on the Long Tom, in the hands of Joseph Kelsey, and a fourth near Albany, managed by Mr. Knox.

We put out about 100,000 grafts in the four nurseries, having kept fourteen men shop grafting in Milwaukie all the preceding winter. J. H. Lambert, Noah Hubler, and myself are all who are left in Oregon of that crowd, so far as I know. Philip Lewis, one of the founders of Seattle and the discoverer of coal there, was another.

Those were the days when we expected Milwaukie to attain the position in the commercial world which is now held by Portland, but, like many another good natural site, its advantages were more than neutralized by the greed of the land speculator. We got some fruit in 1851, and a little more the next year. In 1853 we got a good many apples. I helped pick one tree, which bore 240 pounds, which Henderson took to San Francisco and sold for \$1 per pound. In the fall of 1854, quite a number of small orchards came into bearing, and the price fell; in 1856 they had declined to twenty-five cents per pound, and from that time the price tended constantly

downward. Henderson planted quite a large orchard where the race track now is between Milwaukie and Sellwood, and in 1858 gathered from it 2,800 bushels of apples.

Pears, peaches, and plums began bearing nearly as early as apples, and sold for \$1.50 per pound when apples sold for \$1. In 1853, 1854, and 1855, much of the fruit was shipped to California, where, even then, very little of it sold for less than \$1 per pound.

Henderson bought one gooseberry and a few currant bushes, but no blackberries. In 1858 I sent East for the first blackberry plant of which I have any knowledge, though there was abundance of wild varieties. My first sales of blackberry plants were in 1859 and 1860 for \$3 per plant. We tried strawberries a good deal, and in 1851 Henderson went to the States and returned in 1852, bringing a few plants of Hovey's seedlings, but it was a pistillate variety, and in spite of faithful work we got no berries until 1858, when I sent East for a stock of Wyatt's British Queen and several other varieties. In 1849 I sold my strawberries for 75 cents per pound, but the demand was insignificant. It seemed that few people knew anything about the fruit, though perhaps that is not so strange, when we remember that its cultivation to any considerable extent, even in the States, dates from 1849; up to 1860 I had no knowledge of another strawberry patch in the State for market, and the demand was so poor that I quit raising them.

The Royal Ann cherry was one that my brother brought across the plains in his wagon, and was the best we had. It was not until 1860 that we had any Black Bigarreau, Black Murillo, and May Duke. Neither were we the only nurserymen all this time, for I remember that in 1852 the Geer family, the father and Ralph and Fred Geer, had made a start, and took quite as active an interest as any one in fruits and fruit trees.

In 1860 nurseries were becoming quite numerous. My brother quit the business and left Oregon in 1853, and in 1857 William Meek quit, leaving me the sole owner of the Milwaukie nurseries. In 1860 I raised the first Black Republican seedling, which S. Libby Brown of Vancouver, George Walling of Oswego, and Mr. Hanson of East Portland, agreed to graft and introduce, giving me half the proceeds of sales. My share was \$500, and though I have since originated the Bing cherry, of which we sold the fruit in Saratoga Springs last summer for a dollar a pound, and the Golden prune, yet insignificant as the sum was the Black Republican paid me more than any new fruit tree I have introduced.

In early horticulture there were no fruit pests. The Green Aphis I have seen occasionally since I first came to the State, but it has seldom been numerous enough to do much injury. The first I saw

of the Woolly Aphis was on a tree at Camp Capitola, in California, in 1878, and on that they hung in festoons. In 1880 I noticed it in Oregon, and since then it has multiplied amazingly.

To close this reminiscence of the past, I must tell you of the phenomenal yield of a single blackberry I grew when that fruit was new in our State. I grafted 200 on our wild roots and one grew. I gave that careful cultivation, and in its first season the cane grew five feet high, and grew side branches of five feet. I carefully kept it from sun-burning, and picked twenty-three pounds from that one bush. I had one stem photographed, which carried twelve berries, averaging one and a half inches in the long diameter and nearly as much in the shortest diameter. This was at the rate of nearly twenty-five tons per acre, and shows what is possible to the future nurseryman who makes a commercial success of grafting our domestic cane on the vigorous wild roots. The life of horticulture has but begun, and I predict that in later years the science of fruit growing will successfully destroy all pests, which have been bred by ignorance and carelessness.

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## HOW TO FIGHT INSECT PESTS.

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Below we give a lecture recently delivered by Prof. John Henry Comstock at the Leland Stanford, Jr., University. It is full of practical hints for the fruit-grower:—

“The question, ‘How shall we fight our insect pests?’ comes to us from every quarter. Most people engaged in horticulture are awakening to the fact that if they would succeed they must wage war against their insect foes. A bug is no longer looked upon as an insignificant creature unworthy of the attention of the sensible, practical man. We no longer leave the study of bugs to the long haired old man with spectacles on his nose, and toads and snails in his pockets. It is true there are still many sections of the country where an entomologist is dubbed a ‘bug-hunter,’ and is looked upon with pity and ridicule as only a step removed from a *non compos mentis*. But the fruit growers of California have learned to look upon the study of bugs from another point of view; they have learned that if they are to succeed they must wage war against the insects that prey upon their trees; and many are the questions they ask us regarding the way to carry on this contest.

“The methods of combating insects have changed greatly with the advance of science. The aborigines, as Longfellow tells us in his ‘Hiawatha,’ drew charmed circles about their grain fields to

protect them from the insect pests; and we learn from old records that in those early days the more highly civilized people of Europe appealed to their priests, who in turn excommunicated the hordes of insects that were destroying the crops.

"Today we have learned that not by faith alone but by works are we to succeed. Still the fascination of magic has not entirely passed away, and the tree doctor who bores the auger-hole in the trunk of the infested tree and plugs it up with sulphur or some other substance, with the assurance that by this means the tree will be rendered distasteful to all insects forever thereafter, has a pretty large following; and the pointing out of the fact that the insoluble sulphur is not absorbed by the tree, but remains where placed, makes little difference. But the tree doctors of this stamp are becoming less in number. This is the age of careful experiment and the application of results obtained by experiment.

"The first principle to be laid down regarding the methods of fighting insects is that each species of insect to be fought must be made the subject of special study. There is no 'cure-all' for the ills of plants any more than for the diseases of men. In order to fight an insect successfully we must know something of its structure, of its transformation, and of its habits; for what is the best possible method of fighting one insect may be of no value whatever against another. Obviously the fruit-grower cannot go very deeply into questions of insect anatomy, but there are certain elementary principles which it is necessary he should understand if he is to succeed in combating insects. The most important feature in the structure of insects as bearing on applied entomology is the structure of the mouth parts. We find among insects several very distinct types of mouth parts, each adapted for a special mode of eating. Thus, the way in which the grasshopper destroys the foliage of plants is very different from that in which the *Aphis* accomplishes the same object; and both differ greatly from the way in which either a bee or a butterfly sips nectar from flowers. It is true that careful scientific investigation has shown that all these different forms of mouth parts have been derived from a single type; but very different results have been reached in the development of the different groups of insects.

"Roughly speaking, the different types of mouth parts may be classed under two heads—the biting and the sucking. With the biting insects we find that the mouth parts consist of an upper lip and lower lip and two pairs of jaws moving sidewise between these lips. This form of mouth can be easily seen by studying a grasshopper or a beetle. Insects possessing this type of mouth chew up the tissue of the plant upon which they feed and swallow it. In



this way the insect just named, as well as the many kinds of caterpillars that destroy the foliage of plants, devour bodily the tissue upon which they feed. Such insects can be destroyed by means of poisons applied to the surface of the plants. But in many other insects the mouth parts have been generally modified, and the departure is so far from this type as to appear at first sight to have little in common with it. We find that the insects that are properly called bugs, the plant lice, the scale insects, and many others, do not appear to have jaws. When the mouth parts of the bugs are examined they are seen to consist of a long beak-like organ, which, when dissected, is found to contain four minute bristles. It has been proven that these bristles are really the modified jaws; but their action is very different from that of the jaws of chewing insects. By means of the bristles the bug is enabled to puncture the tissue of a plant or an animal, and the blood or sap, as the case may be, is sucked through the hollow tube containing the bristles. The plant lice, aphids, and the scale bugs are good illustrations of insects with mouth parts of this type. These insects, when they attack a plant, push their beak into the tissue of the plant and suck its juices. It will be readily seen that any poison applied to the surface of the plant will not be taken up with the food of the insect, but may remain upon the plant as harmless to the insect as mere dust.

“Another feature in the structure of insects which is of interest to us in this connection is the structure of the organs for breathing. It should be understood that insects do not breathe through their mouths. If the body of the caterpillar be examined it will be found to consist of a series of rings or segments, and if the side of the insect be examined with a magnifying glass there will be seen upon each of these segments a minute opening. This is a breathing hole or spiracle. These spiracles are the openings of a system of air tubes that extend to all parts of the body of the insects. They are not borne by all the segments of the body, but the most of them, the number differing with different insects. It is believed that the action of certain insecticides is to close up these spiracles. Thus, it seems probable that many of the washes which are so efficient in the destruction of insects owe their efficiency to the fact that a delicate film is formed by them over the body of the insect, and thus the spiracles are closed and the insect suffocated.

“One of the most striking features presented by the study of insects is the remarkable transformations in form and in habits which many of them undergo in the course of their lives. Thus, the grub, a caterpillar feeding upon the foliage of the plant after a time ceases feeding and changes to the chrysalis, which bears very

little resemblance to the caterpillar. After a period of apparent rest there bursts from the chrysalis the beautiful-winged insect which bears much less resemblance to the caterpillar than did the chrysalis. In fact, the two stages of the same insect are so different that if the fact had not been ascertained one would not believe that the two had anything in common. The butterfly lays its eggs, and from these eggs in turn are produced other caterpillars, thus completing the circle.

“Not all insects, however, undergo a complete change in form like this. The young bug when it hatches from the egg resembles the adult in form, except that it has no wings. As the insect increases in size the wings are gradually developed, becoming longer with each shedding of the skin, until finally the adult stage is reached. In the case of those insects like the butterfly, which undergo a complete metamorphosis, the different stages are specialized for particular functions. Thus, the larva, as the caterpillar, grub, or maggot is termed, represents the feeding stage. It is in this period that the insect eats and grows. The pupa or chrysalis stage is one of apparent rest, although it is then that the organs are changed in form. The adult stage, that is, the butterfly, beetle, or the fly, is the period of reproduction. It is then that the insects pair and the females lay the eggs. A knowledge of the different stages in the life history of the insect is of prime importance to one who would combat it; for it often happens that the insect is much more easily destroyed in one stage than another. Sometimes a trifling detail in the habits of an insect will afford a clue to the best way of fighting it. Thus, the fact that the Codlin Moth lays its eggs on the blossom end of the apple about the time the petals fall afford us the best means of combating this pest. A better illustration of the importance of knowing the complete life history of a pest in order to enable us to fight it could not be adduced.”

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## SPRAYING TREES.

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By DR. A. MILLS, Dundee, Oregon.

For spraying fruit trees the first requisite is a spray pump. Of these there are many patterns, and they sell at from \$1.50 to more than \$100. To my mind the Bean spray pump is the best; not that my experience is very extensive, but I judge that the principle of an air chamber for continuous pressure is better than a machine that stops spraying soon after pumping ceases.

I think any man with an apple or pear orchard of two or three hundred trees can afford to buy a good pump and should use it often. The object of spraying fruit is to destroy aphid, (both green and woolly), caterpillars, codlin moth, blight, and scab, the last two named being fungous diseases. We will take up the pests in the order named: Aphid. Probably the best remedy for these is kerosene emulsion. I have tried, with apparent success, a tablespoonful of carbolic acid to three gallons of strong soap suds, for the destruction of Green Aphid. This might be made much stronger with acid while the buds are dormant, and may be worthy of further trial. We need not expect good fruit and late keepers while the vitality of the trees is being taken up by these insects. London purple and Paris green have no effect on Aphid. Caterpillars, or any leaf-eating insects, can be destroyed by spraying with arsenical poisons. Codlin Moth, the same. In spraying for Codlin Moth I would not recommend spraying so soon after the blossom falls as is usually done in the East. I believe our nights are so cool as to prevent the Codlin Moth from hatching out so early here, yet it is better to be in time to catch all the worms. For blight and scab there are several remedies. Perhaps the best is a modified Bordeaux mixture. W. J. Green says that it is proven that four pounds of sulphate of copper and four pounds of lime to fifty gallons of water is strong enough to do all the work expected from the Bordeaux mixture, and he thinks many times it should be weaker than this.

This modified Bordeaux mixture is superior to ammoniacal mixtures, in that it sticks better than any other fungicide. Being so good to stick to the trees and fruit, it will require a less number of applications. One must learn partly by experience about how often and how long to continue spraying with this mixture. It has another advantage. Paris green or London purple may be used with it and better results will be obtained than when they are used alone. Lime is a great preventive against burning the leaves with these arsenical poisons. You will find upon examination that almost all apples and pears in old orchards are more or less affected by the Scab. It was stated, at the January meeting of the State Horticultural Society in Portland by a prominent fruit dealer, that there are no pears to ship. Let us awake to the fact that we must spray or our fruit will not come in competition with those who keep up with the times.

Does spraying pay? Mr. Frank Wellhouse, a large apple grower, says: "We sprayed 160 acres of apple orchard twice and 320 acres three times, and fully 50 per cent of the Codlin Moth were destroyed; some observers say 75 per cent." Mr. E. Clark, Osage City, Kansas,

says: "I would not take \$100 for my sprayer and do without it, for I have gained 70 per cent over last year." This is almost the universal testimony of every man who owns a sprayer and uses it to the best advantage. Do not buy a cheap pump that will not give good satisfaction and will soon wear out. Use a good, fine nozzle and keep the pressure up. Do not trust to hiring some one, but do the work yourself; then do it right. Take some good horticultural journal and keep posted. You can make a success of very few things without study and care. It is so with spraying, and again we say, spray.

## RESPONSIVE ADDRESS.

By DR. J. R. CARDWELL, Grants Pass meeting, 1892.

*Professor Benson, Fellow Horticulturists, Ladies and Gentlemen of Grants Pass:—*

We thank you for this privilege of meeting with you and becoming better acquainted. We are unable to express to you our hearty appreciation of your kind words of welcome, and the pleasant surprise of this elegant and cordial reception in speech, music, and flowers so gracefully tendered us.

Your varied resources, the rich scenery, great fertility and extent of your country, the substantial growth, beauty, and prosperity of your growing city, your large business buildings, churches, schools, and homes of elegant architecture, mills and factories are all a revelation to us. We had heard of your prosperity, but, behold, the half had not been told us. Your far-reaching forests of gigantic trees, your milling and wood manufacturing industries, your rich and varied farming resources, gardens, orchards, and vineyards all bespeak a rapid growth and continued prosperity.

We remember that some of the best and most agreeable people who visited Portland are from Grants Pass. We know that our finest peaches, melons, grapes, and small fruits are from Grants Pass; our best white pine lumber, sash, doors, and home-furnishing material come from Grants Pass. How much more you furnish us I do not know, but doubtless many things. Here, in this mild and equable climate of sunshine and gentle breezes, every man may literally sit under his own vine and fig tree and enjoy a worldly prosperity not given to many spots of the earth. I congratulate you that your "lines are cast in pleasant places," and that you are "called to inherit this goodly land." We come to you not as teachers, but as humble learners in the school of horticulture.

Inspiration records that man was created a horticulturist, and that in his best estate he was surrounded by the choicest fruits and flowers of nature; in his better self and ideal life, he returns to the ancient shrine and in poetic imagery dwells in the Elysian fields of Pomona; prophetic of something higher and better attainable in the future. There is no more impressive passage in history than that which relates to the great Roman, Cincinnatus, who, thrice called from his quiet retreat on his Sabine farm to the Dictatorship, and when with his sword he had dispelled the foe, and by his wise counsels saved the country and established the Republic, his services no longer needed, again as often he returned to the plow and the enjoyment of his rural home. And so the father of his country, our Washington, sought rest and repose in country life, and with heart and hand created the beautiful and sacred Mount Vernon. Jefferson, Jackson, Webster, Clay, and a host of others show this innate aspiration for that purer, higher, and better life of the horticulturists, nearest to God and to nature.

Fruit culture is most fascinating, ennobling, as well as the most profitable branch of horticulture, and the advance in the fruit product is evidence of the culture and civilization of a people. It is hard to over-estimate the beneficial influence on health, morals, and manners of a generous fruit supply. The ornamental grounds and orchards of the homestead do much in childhood to strengthen that love of home and pride of family which is the foundation of all patriotism. The cherished memories of home thus enriched are, in after life, the strongest bond of family to bring back the absent and wandering to the roof tree; and the erring one is not wholly lost as long as these sacred memories of home and childhood sometimes come to swell the heart and dim the eye with the tear of repentance and contrition.

The fruit industry as a business, in its variety, extent, and commercial importance, as we find it today, is of recent origin and within the memory of the present generation, a worthy tribute to the brain and muscle of men of our time. National and international communication by water, land, and telegraph, railroads, cheap freight rates, rapid transit in fruit and refrigerator cars created the supply; inversely the supply increased creates the greatest demand—an inexorable law of trade. The future commercial possibilities of the fruit trade are full of promise, and in the light of the increase in the last few years justifies the most sanguine speculation. Shipping green fruit, canning, and evaporating are discoveries of today, and yet in their infancy. These processes will be improved upon, extended, and cheapened, and other improved methods of packing, preserving, and transporting will be discovered

as popular taste is cultivated. The new glazed fruit industry is capable of indefinite extension; fruit as a confection to eat out of the hand is a new and growing industry. The manufacture of fruit butters, marmalades, jams, and jellies, not to speak of fruit ciders, vinegars, brandies, wines, and spirits, are undeveloped business schemes of great promise. Brain and muscle are at work in these lines and will succeed.

Again, in behalf of the Oregon State Horticultural Society and visiting friends, allow me to return to you our heartfelt thanks for this generous and cordial reception.

## NEWBERG HORTICULTURISTS.

Address by A. H. CARSON.

A special meeting of the Newberg Horticultural Society was held at the pavilion of the fair grounds at Newberg, Saturday, July 9th, for the purpose of listening to an address from Hon. A. H. Carson, of Grants Pass.

There was a large attendance of practical and intelligent fruit growers, who gave the closest attention to what was said by the speaker. Mr. Carson in opening said that he would speak in an informal way upon

### GENERAL ORCHARD WORK.

Among other things, Mr. Carson said that while he has been in the business of raising extensively fruit and fruit trees for a number of years, he would be a most supreme egotist if he should say he had learned the business. It would be more than one person could do to learn all there is to be learned about one of the several departments of the work, and there are always new phases of the question coming up and new questions to be settled. One of the good features of the meetings of such organizations as the Horticultural Society is that it enables the members to profit by the experience and knowledge of each other.

In coming to the topic he intended to talk upon, he would lay down as his first proposition the manifest fact that Providence intended this for a fruit-growing country. The fruit-growers of Oregon are, as yet, however, still working in the experimental stage.

The first requisite for fruit-growing is a thorough knowledge of soil and its adaptability to fruit-growing; and the next, thorough preparation of the soil.

As an illustration of what is necessary in this line, take the prune for example. If the land is not thoroughly drained it is impossible to get the full benefit of the fertility of the soil. The roots of the prune, and most other trees except the willow, will not go below the water line. The water line should be at least two or three feet below the surface. We drain land both to make it warm and dry and enable it to stand drought, for the action of drainage upon it is such that it brings about both of these results. When there is not good natural drainage the land must be underdrained. On sloping lands quite effective underdrainage can be secured by deep plowing and sub-soiling up and down the hills. In Southern Oregon they reach a depth of twenty-two inches by the aid of the sub-soil plow, and the result is remarkable. He last year planted a piece of dry hill land which had been prepared in this way with sweet corn and melons, and, although the climate of Southern Oregon is much more arid than that of the Willamette Valley, he secured really astonishing yields. Melons were common which weighed thirty-eight pounds, while on the land which had not been sub-soiled melons weighing twelve pounds could not be had. The land was not irrigated, but remained moist all through the season.

Even hillsides which seem dry need drainage. A man in Southern Oregon, in planting an orchard on an apparently dry slope, dug large holes for his trees in order to get depth of mellow earth, instead of using a sub-soil plow. The holes collected water about the roots of the trees and ruined them.

Prune trees should not be planted closer than 20 feet apart. At that distance there are 108 to the acre. On very rich land they should be 24 feet apart. When he commenced the business he made the mistake of planting the trees  $16\frac{1}{2}$  feet apart. In planting he would prefer trees one year old. One of the greatest mistakes made by fruit-growers in this country is in stocking or heading their trees too high. French prunes should be stocked at 20 inches; Italian prunes from 20 to 24. The French or Petit has a more upright growth than the Italian, which is the reason for heading it lower. Rub nothing off the tree the first year, but leave all buds from the ground up. Nothing worse can be done to a tree than to rub off all but one or two of the top buds. The cutting back of a tree has equalized the loss of roots. In order to recover from the shock of transplanting and to produce a healthy development of both tree and roots it is necessary that there should be an ample supply of leaves. Allowing the buds to grow the first year also prevents sunscald and promotes stockiness in the trunk of the tree. Cut nothing off the tree after it has started to grow until it has reached the dormant condition after the first year's growth. The shaping of the tree is then to be commenced. Three to four

branches should be taken to form the head of the tree and the rest cut off.

Upon the subject of pruning, he said it is hard to lay down any rule, but every fruit-grower should know why he prunes. The speaker emphasized that point because he had seen so many orchards in Oregon which have been butchered by professed pruners who know nothing about pruning. One of the finest orchards in this State, situated near Salem, had been well cared for in every other way, but had been pruned in about the same manner the farmers of Illinois shear their Osage orange hedges. This orchard consisted largely of pear trees, and in going through the orchard he noticed that on trees which are from four to five years old twenty-five to thirty laterals had been left. If these do not kill each other off they will grow together in one mass in a few years.

In pruning, regard must be had to securing symmetrical proportions for the tree and providing space for the admission of air and sunlight. Sunlight and free circulation of air are essential to the production of color and flavor in the fruit. In pruning, proper consideration should be had to the habits of growth of the tree and attention given to see that the terminal left after pruning is the one which will grow in the direction desired.

The first year after the prune tree has been stocked, he would cut back one half, and would pinch back the axillaries somewhat during the summer to develop the terminals. Contrary to the teachings of California fruit growers, he would not quit pruning prune trees when they come into bearing, but would continue to prune as long as the tree makes new growth. Skillful pruning will renew the life of fruit spurs, so that fruit can be grown on limbs a foot through.

The peach must be pruned on a different system, because the fruit grows on wood growth of the previous year. It is the practice in Southern Oregon to first take out one half of the new growth, and then cut the rest back one half.

In this climate, he would never prune except when the trees are dormant. The object of summer pruning is to produce fruitfulness by checking the growth and vitality of the tree. The natural tendency of trees is to overbear; hence, it is not desirable to prune in the summer.

A great deal of damage is done to orchards by deep and careless plowing. The plowing and cultivation in orchards should be shallow, not exceeding three or four inches. The cultivation must be constant and thorough. The surface soil, which is in a fine and mellow condition, while it becomes dry itself, acts as a mulch on the soil below. The constant stirring up of the soil breaks up the capillary tubes through which the moisture is drawn out of the soil



and escapes. These tubes form very quickly in hot, dry weather; hence, the cultivation must be very frequent.

Being requested to say something about peaches, Mr. Carson replied that it would be difficult to discuss the subject intelligently in the limited time that remained. In this locality, only iron-clad varieties should be planted. One of these is the Early Crawford. Do not plant the Late Crawford. While the fruit is very similar to that of the Early Crawford, the tree will not compare with it in hardiness. A variety which promises well is the Muir. It is a slow grower while young, and grows unevenly, but has the fully developed glands which are characteristic of the hardy varieties. It was a chance seedling in California. The fruit has proved extraordinarily fine. The Salway is a very hardy variety which ripens in Southern Oregon, but may be a little too late for this section.

He and other nurserymen are now propagating a new variety of peach which was originated by Governor Briggs at Applegate, Oregon. It appears to be a seedling of the Early Crawford, is hardy, and is four or five days later than the Early Crawford. He has grown specimens of this peach fourteen inches in circumference. It is in every way a most promising peach, but it must be said that it is as yet an experiment. He calls it the "Governor Briggs."

The question arose as to whether peaches make good roots for the prune. Mr. Carson said that in Southern Oregon they use peach roots for the most part. On dry land which is underlaid with sand or gravel peach roots do well. On most of the land in Northern Oregon he would not think it advisable. The Myrobolan plum is expensive, but it makes the best root for prune trees.

In reply to a question, Mr. Carson said that all trees that bear stone fruit are liable to what is called gum on the bark. It is caused by sudden extremes of heat and cold, and the contraction and expansion resulting therefrom which bursts the bark of the tree. When it is observed take a knife and cut out the gum clean to the inner bark of the tree; cover with grafting wax and muslin.

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## TIME TO BEGIN PREPARATIONS.

Next year is likely to be a critical one in the history of prune-growing in Oregon. The yield of prunes was not up to the average last year, and this year has been the most unfavorable known to the business. If the yield is good next year, the aggregate product will be many times what it has ever yet been. The amount will be great

enough, in fact, to make the Oregon product a very perceptible factor in the supply of the United States, and the character of the Oregon prunes thrown upon the market next year will have a predominant effect in establishing the reputation of the prunes of this State.

It is not too early to begin preparations now. Every fruit-grower of Oregon and Washington as well, who has a few acres of prunes of bearing age should at once commence an earnest study of the question how he is going to take care of his fruit next year. The planting and cultivation of prune trees is a simple matter. The proper handling of the product is a complicated one, which calls for the exercise of both skill and business management. This subject is brought up at this time because it is found that the majority of growers do not seem to realize what is before them. They talk confidently enough about the large quantity of fruit which their trees ought to yield next year, but they act as if they expected nothing of the kind. If there should be a big prune crop next year one half of it is likely to rot for want of sufficient evaporators, and more than one half of the balance to be practically spoiled for want of skillful handling. The part which rots will be a heavy loss to the growers who raised it. The part which is injured for want of skillful handling will be a great and lasting damage to all the prune-growers of the State, because it will go into market to create a bad reputation for Oregon prunes. Oregon's opportunity in this matter is great if our growers will only awaken to the character of the emergency. Oregon prunes unquestionably surpass those of California in size, and, if properly evaporated, in flavor. If they are cared for and put upon the market with as much skill as the California product, our prunes would take first place upon the markets in the United States without a question, and the time is not far distant when there will be no profit in raising prunes unless they do take first place.—*The Rural Northwest.*

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## LUNGS FOR THE SOIL.

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There is scarcely any common soil, unless it be underlaid with gravel, but to which a judicious system of tile drainage might be applied with great profit, which would serve as a most perfect set of lungs through which to breathe the breath of life to its own resurrection. Such lungs not only supply the earth with air, laden with the very elements of fertility, but also remove the stagnant water and poisonous gases that so long held it in death, says W. R. Fitz-

water in *Drainage Journal*. They also prevent the escape into the air of these gases by preventing their formation, and also much vapor from the water of saturation that would carry with it large portions of the elements of fertility that come into contact with the soil from decaying vegetables and other sources, thus saving these elements to the soil. By the natural respiration of the earth through these lungs the air takes the place of the detrimental elements that have been prevented, and chemical action immediately begins—the earth crumbles like the rock in the presence of the air, only more rapidly by many fold; the soil becomes more pliable to the implements of agriculture, and as it becomes pulverized, nature's own process of nitrification is taking place; richness is rapidly being added from nature's own circulating medium—and without further application the air and grass get a start, and thus often save many dollars' worth of time and labor that would be required to put the crop in growing condition again, if we had to wait the slow process of evaporation or percolation to remote distances for the removal of the water of saturation.—*The Rural Northwest*.

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## BERRIES.

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By D. W. COOLIDGE, Eugene, Oregon.

Of the many superior fruits that our favored climate and soil produce, there are none, when eaten fresh from the plant, to take the place of the berries. Who is there that does not relish a man's size piece of fresh gooseberry pie along about the first of May; and when this tart fruit has whetted up his appetite, what more welcome visitor could there be, what more dainty relish is there, than a plate of ruddy, ripe strawberries? There is no berry that flourishes in all countries, and at the same time so delicious, as the strawberry. It is a native of the temperate latitudes of both hemispheres; of Europe, Asia, North and South America, though the species found in different parts of the world are of distinct habits, and have each given rise, through cultivation, to different classes of fruit—scarlet strawberries, pine strawberries, wood strawberries, hautboys, etc.

The name of this fruit is popularly understood to have arisen from the common and ancient practice of laying straw between the plants to keep the fruit clean. In the olden times the varieties of strawberries were very limited, and the garden was chiefly supplied with materials for new plantations from the woods.

The strawberry belongs properly to cold climates, and though

well known, is of comparatively little value in the south of Europe. Old Roman and Greek poets have not, therefore, sung its praises; but after that line of a Northern bard, "A dish of ripe strawberries smothered in cream," which we consider a perfect pastoral idyl in itself, nothing remains to be wished for.

The season of the strawberry in the Willamette Valley ordinarily extends over a period of from six to eight weeks; but where one has water that he can use for irrigating purposes, and by planting the new strawberry originated near Mount Tabor, in Oregon, the "Oregon Everbearing," he can supply his table with this best of all berries until late in the fall.

There is a diversity of opinion as to which culture and method of treatment is the best for the strawberry; but after six years' experience in no less than four different modes, we have come to the conclusion that, everything being considered, the solid row is the best. By this we do not mean the matted row. While strawberries will grow on most any kind of soil or under any kind of treatment, yet this fruit delights in and will bring best returns when planted in a rich, well drained loam.

We consider fall by far the best time for planting all kinds of berries. The ground here never freezes so as to heave the plants, and no mulch or winter covering is at all necessary. Plow the plat allotted to the strawberry bed very deep as soon as possible in the fall; thoroughly harrow and pulverize the soil; then stretch a line, and two persons can set strawberries very rapidly. The first goes ahead with a clean, bright spade, which he forces down in the soil about every fourteen inches, close to the line, pushing it back and forth, and carefully withdrawing, he leaves a wide, deep hole ready to receive the long fibrous roots of the plant. The second person, after carefully removing all dead runners and leaves, and straightening out the roots, holds the plant against one side of the aperture with one hand, and with the other firmly presses the earth against the roots, which have been allowed to hang perfectly straight. This is the way we plant, rows four feet apart, and plants twelve to fourteen inches in the row. We have tried hill culture, the matted row, *i. e.*, allowing the plants to mat at will in the row, keeping the row about fourteen inches wide—the above plan, and no plan at all; and, as before remarked, the solid row gives the best results. In this the plants are set in rows four feet apart, and plants fourteen inches in the row. All runners are kept off, and the cultivator runs through the rows from two to four times before blossoming season; and if the weeds continue to grow, keep cultivating until berries are nearly ripe, although we are aware most berry-growers say that the ground should not be disturbed when the plants are in bloom.

Of the hundreds of varieties of strawberries, four or five kinds are enough for any planter. For early, we like the Jucunda and Sharpless; for midsummer, the Jessie and Burbach No. 5; for late, the Peabody. We are aware that there are many other just as good sorts as these, but any one planting these, if true to name, will not be disappointed with the results.

The subject of strawberry culture and varieties could be dilated upon so as to fill this whole work; but we will drop the matter right here, and say something of the many other superior berries that grow in abundance in Oregon.

Raspberries begin ripening about the first of July in this latitude, and while not nearly so much is ever written or heard of concerning this fruit, it is after all a most excellent fruit.

The name raspberry is probably derived from the rasping roughness of prickly wood. Succeeding the strawberry at the beginning of summer, when there is comparatively little else, this is one of the most invaluable fruits, and with the strawberry generally commands the attention of those who have scarcely room for fruit trees.

For the raspberry plantation, select just such soil and cultivate much the same as you would the strawberry. Very satisfactory results, however, are attained by simply cultivating once in the early spring—usually in February or March, or at least just as soon as the ground is dry enough to go into; and then spread a mulch of old straw or strawy manure between the rows and close up around the plants.

Raspberries should be set in rows six feet apart, and plants four feet apart in the row, and at the end of the first season two strong cedar posts should be set at each end of the row and a No. 12 galvanized wire stretched on either side; and if the row be long, it will be found necessary to place some light supports at intervals between the posts.

In transplanting the raspberry, all canes should be cut down to four or six inches, and no fruit allowed to set the first year, thus allowing all strength to go to the production of a strong, vigorous cane for the next year's fruit.

After the fruit is all harvested, remove all dead canes and all live ones, save from six to eight in each hill. There are practically four distinct kinds of raspberries—the red, the black, the yellow, and the purple, the latter being a hybrid of the red and black species, and having the habits of both.

Of the many sorts that we have tried, we find none better than the Marlboro—a sweet, early red; and the Cuthbert, a large, late, rather tart, red berry. Of the black kinds, the Souhegan and Mammoth Cluster for early, and Gregg for late. The Golden Queen

and Brinkle's Orange are both delicious yellow berries, but we have found neither profitable for market. Shaffer's Colossal is a large, purple berry, of ordinary flavor, but immensely productive. Like strawberries, there are dozens of kinds of raspberries, the introducer of each claiming every merit for his child; but we feel safe in recommending the above—save the yellow sorts—for general planting, either for home use or market purposes.

Ripening at the same time with the late black raspberries, is the dewberry, a running blackberry of excellent flavor. Plant a few Lucretia dewberries in your garden and you will not regret it. Where it is possible to irrigate, the blackberry in the Willamette Valley is immensely productive of very large, luscious fruit. I have known of 500 bushels of this fruit to be produced on a single acre. Blackberries should be planted and cultivated much the same as raspberries. Blackberries and black raspberries should be severely summer pruned, *i. e.*, when the canes get up two feet high, pinch them back. This will cause the canes to throw out many laterals, which should also be cut or pinched back, making a dense hedge, which will need no rack or frame.

The Early Harvest and Brunton are the earliest blackberries, but the staple ones for market are the Lawton and Kittatumy.

Without a doubt, Oregon can lay claim to having produced the finest, hardy, large gooseberry ever grown in the United States. I allude to the Oregon Champion, introduced and originated by Mr. H. W. Prettyman, of Mount Tabor.

The Champion is very large, nearly as large again as the Downing or Houghton; immensely productive, of a fine texture berry, and bush entirely free from mildew.

We plant gooseberries and currants in rows five feet apart, and plant three feet apart in the row, and give clean culture, using a one-horse cultivator.

The Fay's Prolific is the best red, and the White Malheur the best white or golden currant that we have ever seen. The Fay, as its name implies, is immensely productive of very large bunches and berries nearly as large as the old Cherry currant, but not nearly so acid as the Cherry.

The old Red Dutch and Cherry and the White Grape and White Dutch currants are still planted to some extent. Lee's Prolific and the Black Naples are as good as any black currants that we have ever seen; but the black currants are of little use and very slow sale.

It is not generally known that there is a species of the mulberry that makes a delicious sauce, when eaten as other berries, with sugar and cream. I allude to the "Downing Everbearing," a tree with beautiful habit of growth, very large, almost round, glossy

leaves, and, were it not for the fruit, it should be planted as an ornamental tree. The berries are sometimes one and a half inches long, are a rich sub-acid, and we have yet to see a single person who does not relish this fruit, which continues ripening for a number of weeks.

This whole paper could be filled with a description and history of the many-hued, many-flavored and many varieties of Oregon's wild berries, some of which possess a flavor that has never been equalled in the domesticated sorts. I allude particularly to the running blackberry, found everywhere in this valley, in the river bottoms and on mountain sides. It has a peculiar aromatic flavor that everybody likes, and this fruit readily commands double the price of the tame sorts. In glancing back over my paper, I notice that I have failed to speak of the Evergreen blackberry, which a great many people suppose to be indigenous to Oregon. While such is not the case, inquiry develops the fact that in no section of the Union does the berry flourish except in Oregon and Washington. The Evergreen blackberry is unlike any of its family, inasmuch as the canes do not die annually, but continue to grow from year to year, and it merits its name by retaining its foliage throughout the entire year. Right here it is immensely productive of very large berries, which continue ripening until late in the autumn, and it is not an unheard of instance to pick this fruit ripe from the vines on Christmas day. While we do not like it as well as the Lawton, it is a pretty good fruit for jelly or preserves, and nearly every garden has one or more of these vines.

The wild strawberry is a very good fruit, and most seasons very prolific, but the berries are small and grow so close to the ground that we do not bother with them when our first tame ones are ripe. The currant, the gooseberry, the raspberry, the salmonberry, the thimbleberry, the solalberry, the huckleberry, and many other sorts of berries grow wild all over Western Oregon, and much time is spent by old and young in pursuit of them.

In bringing this paper to a close, we will remark that we lay no pretensions to being a scientific horticulturist; neither do we pretend to be a writer. Berry culture and fruit culture in general has always been very fascinating to us, but so far we have only been able to pick up a few crumbs of the practical part; but we are young, and hope in time to be able, if called upon, to produce a more readable paper than we fear this will prove.

## GRAPE GROWING IN THE WILLAMETTE VALLEY.

By HON. A. E. SHIPLEY, member Board of Regents, State Agricultural College, Corvallis, Oregon

Grape-growing, particularly as a commercial industry, has not assumed large proportions in the valley of the Willamette. The climate is not very well adapted to the growth of grapes; the seasons are of good length, but the nights are cool, so that only the earlier varieties are sure to ripen. In most of the low-lying and level parts of the valley, spring frosts are liable to destroy the crop, and in all parts it is subject to great damage by mildew. Cold rains in the blooming season are also a source of great damage to the grape-grower. These are the natural and unavoidable conditions surrounding the business of grape-growing in the Willamette Valley. To them may be added the fact that our grapes are mostly thin-skinned and tender, and consequently do not bear shipping long distances, as do the tougher skinned grapes grown in hotter and drier climates. While all this is true, as proven by the experience and observation of twenty-five years, it is also true that there are many localities in this valley where, with proper knowledge and labor, the business of grape-growing may be carried on with fair measure of success. While it is true that our home market is limited, and distant ones cannot be reached, the excellence of our product will gradually cause a better appreciation and a largely increased consumption among our own people, for it is also true that our Oregon grapes when well grown and ripened are unsurpassed in quality. They are not mere bags of sweet juice, but highly flavored and full of character.

Our Concords and Delawares for size and quality are unequalled in America, and France herself cannot produce finer Muscadines and Hamburgs than grow on the sunny hills of Western Oregon. Having said this much by way of introduction, we will consider briefly the subjects of location, soil, planting, cultivation, pruning, varieties, etc.

### LOCATION.

Of course, the best location for the grape is the south side of a not very steep hill having a suitable soil, and there are many such locations in this valley admirably adapted to the growth of the vine; but any fairly rich and well-drained soil will grow good grapes. It will be all the better if it contain a considerable proportion of sand.



It should be plowed deep and put into a fine state of cultivation before planting. We have discarded the practice of trenching as too expensive and unnecessary. Well-rooted one-year-old vines are preferable for planting, and they may be set in spring or fall. Each vine should have at least sixty square feet of ground. A good plan is to set the plants seven feet apart in the row, and place the rows nine feet apart, as this allows the use of a two-horse team in cultivation one way. If the location is on a side hill, the wide rows should run up and down the hill. Foreign varieties may be planted a little closer, but too close planting should be avoided.

How to plant: Before proceeding to set the plants, the ground should be laid off by driving a stout stake four feet long where each vine is to stand, and care should be taken to set the stakes perpendicularly and at least a foot deep. Having set the stakes, which should be of sound cedar, the next thing is to dig the holes for the plants. They should be eight to ten inches deep, the best and finest earth thrown on one side, the bottom smooth, and one side close to the stake, which should be left standing while digging the hole. The plants should be cut back to two buds, and the roots prepared by cutting out the immature and superfluous ones, and pruning the others to eight inches. Now, we place the vine in the hole with the stem as close to the stake as possible, and the roots spread out on the bottom in the shape of a fan. The lower bud should be on a level with the top of the ground. Next we fill in the fine rich earth to the depth of three or four inches and tread it down firmly, after which we fill up the hole with the remaining earth, which is left loose.

I have been thus particular in describing the mode of planting, because much of the success of the plant depends upon it. A good, well-rooted vine thus carefully planted will always make a good growth and be a success unless mismanaged in its after treatment.

#### PRUNING THE GRAPE.

There are many systems of pruning the grape, but the principle is the same in all. The object is to keep a supply of bearing wood within reach of the vineyardist. The grape produces its fruit on shoots, which start from buds on canes of the last year's growth, and the natural tendency of the vine is to climb upward and bear its fruit each year farther from the ground, as shown by the wild vine of the forest. By pruning, which must be done *every* year, we counteract this climbing instinct and keep the bearing wood in proper quantity close to the ground.

In this paper we will confine ourselves to the consideration of one method, which we have found to be the cheapest, simplest, and on

the whole as good as any. This paper is not written so much for the vineyardist as for the farmer who does not expect to grow grapes for the market, but wishes to raise a few for the use of his family. The professional grape-grower will select his own style of pruning and give it the attention necessary to make it a success; but if the general farmer prunes and cultivates his vines in the spring, it is about all we can expect of him, and he should adopt a method which, under these circumstances, will give him a fair crop of grapes each year. The plan which I propose to describe, and which, after years of experience, I have adopted in my own vineyard, will do this, and is known as the Hungarian system or Buck pruning. It is used extensively in California, is the cheapest and simplest of all, and can be learned easily and quickly by all.

To illustrate the system, we will take a vine and carry it through the various stages of growth, pruning, and cultivation till it comes to full bearing. We will suppose the vine to be well planted, cut back to two buds, and a stout stake four feet long set firmly by its side. If both buds start, the weaker one must be rubbed off when ten or twelve inches long, and the other tied to the stake and left to grow at will during the season. The ground should be well cultivated, which may be done with plow, cultivator, or hoe. At the end of the season we have a cane three to six feet long, which, at the pruning season, must be cut back to two buds. The treatment during the second summer is precisely the same as during the first, only one shoot, the stronger, being permitted to grow, and it must be kept firmly tied to the stake, as we wish it to grow perfectly upright this season. Thorough cultivation and the destruction of all weeds must not be neglected if we desire the best results. All suckers and any fruit that shows itself should be removed, our object being to grow one strong cane. This cane at the proper period must be cut so that the upper bud will be two or three feet from the ground, the cut being made at least two inches from the bud.

We are now at the beginning of the third year. The treatment of our vine consists simply in good cultivation and the removal of all suckers and shoots that push from buds within six or eight inches of the ground. Fruit showing itself this year may be permitted to ripen. No summer pruning is necessary. The shoots are permitted to grow at will, and need not be tied up, but the main stock must be kept firmly tied to the stake. We desire to maintain a uniform growth among the different shoots so as to secure a symmetrical, well-balanced head. This may be done by pinching the more vigorous ones.

This brings us to the end of the third season, and our vine should look a little like an umbrella with three to five ribs, and may carry

eight to fifteen bunches of fruit. At the beginning of the fourth year each cane must be cut to two buds, always making the cut an inch or more beyond the bud. We now have a straight stem two and one half or three feet high with three to five spurs of two buds each. Each bud should push and bear two or three bunches, giving us eighteen to thirty, as much as a vine in its fourth year should bear.

During this and each subsequent season we should aim to maintain a uniform growth among the different shoots, always encouraging the shoot growing from the lower bud on each spur to make a vigorous growth, because it becomes the spur from which the fruit-bearing cane for the next year must grow. This can be accomplished by pinching the shoots, starting from the upper buds when they take the lead, as they are apt to do. At the end of the fourth season we have three to five branches, each bearing two canes. The upper cane on each branch is to be cut away, and the lower one cut to two buds as usual. We will also have a few canes growing from base or dormant buds. They should all be cut away but two, which we prune to two buds, the vine being now able to sustain five to seven spurs with their load of thirty to forty clusters. One or two spurs may be added in the same manner each year till we have ten or twelve, which is enough for any vine. This is one of the simplest systems known, and one of the best. After the head is formed, it consists in simply cutting away the upper cane of each branch and pruning the other to a spur of two buds. But it requires judgment, observation, and practice.

The pruner, before he touches a vine, should be able to picture it in his mind as it will appear at the end of the season. The temptation to leave too much wood must be finally resisted. All suckers must be cut entirely away. Thorough cultivation should be given each season, but it need not be deep. If good cedar stakes are used they will last till the vines are stiff enough to support themselves. Every farmer should plant from twenty-five to fifty vines for the use of his family. Their pruning need occupy but a few hours each year, and it can be done during the winter. Their cultivation can be done in a short time with horse and cultivator. It should be attended to early in the season, before the feeding fibers occupy the upper soil, and should never be very deep.

#### WHAT VARIETIES TO PLANT.

The professional vineyardist will, of course, select those kinds which are best adapted to the purpose for which he grows them. If for wine, he will plant wine grapes; otherwise, what he considers

the best table grape, taking into consideration their shipping qualities. For the farmer who plants for his own use, I would recommend Delaware, Concord, Hartford Prolific, and Isabella. These are pure natives, hardy, productive, of good quality, and free from disease. They resist phylloxera, and are seldom attacked by mildew. I have tested nearly all the new varieties of note, but not one of them has given entire satisfaction, except, perhaps, the Worden and Herbert, which might be added to the above list. The Royal Muscadine, when well cared for, is a magnificent grape, of the best quality and early, but it will not bear neglect, and is very liable to mildew. The Black Hamburg is a noble grape, of the largest size and best quality. It is a fair shipper, and does well in some localities, but mildews badly, and is worthless for the general farmer.

#### DISEASES OF THE GRAPE.

The only disease we have had to contend with is mildew, which prevails quite extensively in Western Oregon. So far as I know, it always starts among the foreign or hybrid varieties, and for this reason I advise the farmers to plant only natives. Mildew is an insidious foe, very liable to commence its destructive work just at the time when the farmer is busiest with his harvesting. If not promptly checked, it spreads rapidly and soon ruins a vineyard. The only effective remedy we have yet found is powdered sulphur. If applied in time, this has never failed to prevent the disease, and if it has already made its appearance, the free use of sulphur has always arrested its further progress. The sulphur should be blown or sprinkled on the leaves of fruit during hot, dry weather. The rot—the great enemy of the Eastern grape-growers—has not to my knowledge made its appearance in our State. The phylloxera, the destroyer of the French vineyards, is also as yet unknown in this valley; but unless we exercise more care in the future than we have in the past, it will surely come and work destruction among our foreign vines, as it is doing in California. It behooves us to be warned in time. Viewing the subject from the standpoint of twenty-five years' experience, I am led to the conclusion that as a commercial industry, grape-growing will never take high rank in Western Oregon, not only for the reasons already given, but for the further reason that we can never hope to compete with California in the manufacture of either raisins or wine.

## ORCHARD PLANTING.

By H. B. LUCE.

The attempt is to give the readers of *Fruits and Flowers* some observations on my limited knowledge of orchard planting. I shall confine my remarks to the field of my experience—the Willamette Valley—whose soils and climatic conditions are measureably uniform.

We are on the threshold of a new era in horticulture in Oregon. The pioneer times have passed away, and the old mossgrown, unpruned, and uncultivated orchards, containing many worthless and too many varieties, must be grubbed up and new ones planted to supply foreign markets and home demands. Some hesitate to plant more fruit trees for fear of over-production and unremunerative prices. Such doubting Thomases ought to take California, which has almost doubled her orchard area in the past two years, as an example, and take courage. California glutted Eastern markets with her fruits two years ago, selling at auction carloads of fruit for less than cost of transportation. Nothing daunted, next year she increased her area of planting and vastly increased her Eastern shipments, yet found a market for all her fruits at advanced prices. Her previous shipments had advertised her productions and opened markets that she could not have won by selling to commission houses at equal prices with competing products from Europe. The fact is, we Oregonians are shut up to our home market because of our limited production, and we become discouraged when we glut our home market and realize low prices. When we raise a supply of good shipping fruits, so that we can ship by the train load to the Eastern States, or by the ship load to Australia, Great Britain, and South Pacific ports, then our green shipping fruits will find a willing market abroad, our dried fruits will drive European products out of the Eastern States, and our home markets, relieved from the glut, will offer better prices for domestic supplies. California horticulturists have demonstrated this fact for us, and we should unite with her in conquering these markets and holding them for our own forever more.

### WHAT TO PLANT.

For the family orchard several varieties of each kind of fruit ripening in succession should be selected. (For a description of the varieties herein named the inquirer is referred to nursery cata-

logues and horticultural works.) A dozen cherry trees—May Duke, Early Purple Guigne, Black Tartarian, Yellow Spanish, Royal Ann, Black Republican, and Late Duke. A half dozen peach trees—Avery's Early, Crawford's Early, Golden Cling. A few apricots—Moorpark is best. A dozen or two plums—Early Golden Drop, Peach Plum, Columbia, and Coe's Golden Drop. A dozen summer and autumn pears—Madeline, Bartlett, Tyson, Fall Butter, Beurre d'Anjou. A dozen winter pears—Easter Beurre, Winter Nellis, Vicar. Two dozen summer and fall apples—Red Astrachan, Early Harvest, Golden Sweet, Sweet Bough, Red June, Gravenstein, Fameuse Fall Pippin; and twenty-five winter apples—Jonathan, Yellow Newtown Pippin, Lady Apple, Golden Cheek Pippin, Yellow Bellflower, Golden Russett, Tompkins' King, and Tallman Sweet; and two or three crab apples—Transcendent, Hyslop; also a dozen prunes—the Italian.

But the selection of varieties for commercial purposes is quite a different proposition. Only a few varieties should be chosen, and those with reference to their growing and bearing qualities and the market for which they are intended. The great defect in Oregon orchards today is that they contain too many varieties, so that the owners cannot ship by the carload.

#### SUMMER AND FALL APPLES.

There is no market abroad or at home for summer or fall apples worth the attention of the commercial dealer, for they come in direct competition with our luscious berries, peaches, and grapes. It would seem, however, that we might secure a market for early apples in the mountainous regions east of the Cascade Range. But as our State is rapidly filling up, our towns begin to offer a local market for a limited supply of this fruit. For this purpose, the Red Astrachan and the Gravenstein are the best.

#### WINTER APPLES.

For extensive apple-growing a few of the best varieties of winter apples should be planted, and the location should be carefully chosen for special adaptations. The best shipping apple in our State is the Yellow Newtown Pippin, but it is a poor grower and bears inferior fruit in most localities in our valley, though it succeeds well on the slate, quartzite, and granite soils of Southern Oregon, and in the drier regions of Eastern Oregon. The Red Cheek Pippin, Esopus Spitzenberg, and Golden Russett are all good shippers, but the trees are not strong growers or healthy. The Northern Spy is a good shipper and the tree is thrifty, but it is a

shy bearer in many localities, and it is a late bearer. The Jonathan and White Winter Pearmain are also good shippers. But among all of them, Oregonians have not yet selected one that is satisfactory as an apple for extensive commercial purposes and especially adapted to our soil and climate. I suggest the Ben Davis for this purpose. Its quality is only second rate, but it is large and red, and the tree is healthy and a strong grower.

The best soil for the apple is a deep, rich, moist, calcareous loam, but it will thrive on shallow soils; even clay underlaid with gravel has proved good, but whatever the nature of the sub-soil, it must be sound and open to the passage of moisture. An extremely light sandy soil, or a very stiff clay or adobe are the worst soils for the apple. In all cases where there is excessive moisture, there must be a close tile drainage or the trees will soon die out.

#### CHERRIES

We have but two good shipping cherries, the Royal Ann and the Lewelling, or Black Republican. The only soil suited to them is high and dry locations with a porous sub-soil.

#### PRUNES AND PLUMS.

The commercial prune for this State is undoubtedly the Italian. It is the best both for domestic and export purposes. It is not so prolific as some other varieties, but it is very dark in color, has a thin skin, is good size, is pleasantly tart, and is fine fleshed. It is the only prune we have that will compete in the markets with the French prunes of France and California, which it easily leads.

The Columbia and Coe's Golden Drop are perhaps our best commercial plums. The Yellow Egg is the popular plum for the canneries.

In California experience has shown, says Wickson's *California Fruits*, that the prune and plum grafted on Myrobolan stocks thrive in low, moist valley lands, in comparatively dry lands and in stiff upland soils, so that it has come to be accepted as the all-round stock for the plum. Though prunes and plums will endure bad soils, they do better on good soils, a rich, clayey loam being best suited to their growth and fruitfulness.

#### PEARS.

Like the Italian prune, the Bartlett is the favorite pear for Oregon planters. Canners, shippers, and local customers all call for the Bartlett, and they usually sell at the East for nearly twice the price

of other varieties. Owing to this fact it is of importance to select locations for pear orchards which will extend the season of the Bartlett. In hot, dry valleys it matures late in the summer, while on high, north hillsides, or low, moist, shady locations it will mature late in the fall. In some parts of California, Bartletts have been picked as late as November 19th. Doubtless they could be fruited later than that in this State.

The pear likes a deep, rich, clayey soil, but will do well, says Professor Wickson, on shallow clay soil, and over a tight clay hardpan, where most other fruits would not grow well or fail entirely. The trees will thrive in clay loams, or even in adobe soil, says this author, if they are properly cultivated.

#### HOW TO PLANT.

The ground should be prepared by deep plowing, or if there is a stiff clay or hardpan, by sub-soiling to the depth of twelve or fourteen inches in all, and harrowing and leveling with clodmasher until the surface is mellow, even, and fine, avoiding dead furrows and depressions.

#### DISTANCE IN PLANTING.

Most of our old apple orchards are planted too close, and are crowded, the trees being from sixteen to twenty feet apart, which has resulted in stunted, gnarly, and short-lived trees. There is some difference of opinion as to the proper distance for planting apple trees, but certainly twenty-five or thirty feet is close enough, and perhaps even thirty-six feet would be better yet. Even then, when the tree attains great age the branches will nearly meet unless they are carefully pruned back.

The prevailing distance for planting of cherries in this State varies from twelve to twenty feet, though at present the tendency is to a wider planting—from twenty-five to thirty feet, and some plantings have been made even wider.

Peaches, if they occupy the whole ground, should be planted at least twenty feet apart; and the same is true for plums, prunes, apricots, and pears, though twenty-five feet would be better, as the roots will interlace in ten years where the trees are set much closer than twenty feet, and the trees thus draw upon each other's food supply.

But the proper distance apart for all kinds of fruit trees depends much on the quality of the soil. If it is poor and thin, the distance should be greater; if rich and deep, trees will bear closer planting without apparent exhaustion of the soil, but the distance should be



sufficient to permit both the passing of air and sunlight and the passage of teams.

#### MARKING OFF.

Most orchards are laid off in squares, which is the simplest arrangement and for general purposes the best. There are various modes of marking off the ground. One commonly used in small plantings is by measure and sight. Take plasterer's laths pointed at one end, and if whitewashed they will be easier to see. Begin on one side of the ground, measuring the distance between trees with a pole of the length desired, and so locate the ends of the rows all around the field. Then locate a line of stakes each way across the field through the center. After these laths are in place the job can be completed without measuring. The man at the ends of the rows has three stakes to sight by in each row, and the stake-driver places the stakes as directed by the sighter.

But for getting accurate location of trees and vines, and for planting large orchards, Professor Wickson says the best thing is a wire or chain, which is made of annealed wire one eighth of an inch in diameter. The length of the wire varies according to the length of the ground to be measured. If you want to lay off an orchard in blocks of one acre, the wire should be 208 feet 9 inches long. It should have a three-inch ring at each end to slip over the stakes. Along this wire patches of solder are attached exactly at the distances desired between the trees, and to these places a red string or strip of cloth is attached so that the points may be readily seen. Some use a wire cable, about the fourth of an inch in diameter, made of several strands of wire, and the strands are separated and pieces of cloth are slipped through and tied on with a waxed thread.

#### FINDING A TRUE CORNER.

In laying off an orchard, the first thing to do is to find a true corner, and Professor Wickson gives this method: Select the side of the field which is to serve as the base of the square and stretch the wire along that, say fifteen feet from the fence. When the wire is thus stretched parallel with the boundary of the field, place a stake at each end of the distance tags on the wire, and these stakes will represent the first row of trees or vines. To find a square corner, begin at the starting point and measure off sixty feet along this row with a tape line and put a temporary stake; then from the starting point, measure off eighty feet as nearly at a right angle with the first line as can be judged with the eye, and run diagonally from this point to the temporary sixty-foot stake. If the distance be-

tween these stakes is one hundred feet, then the corner is a right angle. Now, having the outside lines started at right angles to each other, one can proceed with the measuring wire and lay off as large an area as he desires, if care is taken to have each line drawn parallel with the last, and all stakes are accurately placed with tags on the wire—providing the land is nearly level, or on a uniform grade. In locating trees over uneven ground, the measurements will have to be made from tree to tree with the tape line, held as nearly to a level as possible.

#### TIME TO PLANT.

Early planting of fruit trees in Oregon is the best, because in our climate the wounded roots begin to heal and fibers are thrown out before winter begins. The trees should be planted about the time the leaves begin to fall, when they enter the dormant state, which is about the first of November. Also the trees get firmly settled in the ground by spring and are less liable to disturbance of roots in the spring cultivation. Further, the soil for planting is usually in better condition than it can be found in the early spring, when the trees have to be either planted in the wet and clammy soil or the planting be deferred until the buds begin to burst to the injury of the trees.

#### AGE TO PLANT.

The best age for trees to be planted is one year old, when they are mere whips, from three to six feet high. At this age the roots are short and small, and the nurseryman will not do them so much injury in digging as when older, and the younger trees recover from mutilation of roots much quicker than older trees. There are many other reasons, but these will suffice.

#### SELECT AND DIG UP THE TREES YOURSELF.

Go to the local nursery to get your trees and take them up yourself, or if you need help, or are too aristocratic, hire helpers to go with you. Don't let the nurseryman or his hired men dig the trees up, otherwise the roots will be cut off within five or six inches of the stem. Be careful not to cut off the tap-roots, for without them the trees will be short-lived and scrubby. The tap-root is the only resource of the tree for moisture in the dry season; besides it stays the tree in storms, and brings it warmth which gives it life to resist severe freezing weather.

#### HEELING IN.

This should be done immediately after the trees arrive from the nursery. Dig a trench large enough to admit the roots and place

each tree in it separately, filling among the roots with fine dirt and pressing it around them, covering them six inches deep.

#### PUDDLING.

The roots of the trees should be "puddled" by dipping them in thin mortar before taken into the field for planting. This will keep those necessarily exposed to the sun or wind from drying to their injury, and it will serve to facilitate the union of the roots with the soil more readily.

#### PLANTING THE TREES.

The next step is the digging of the holes for the trees. The holes should be large enough to admit the roots without cramping. The top soil should be thrown on one side and the bottom soil on the other side, so that the top soil may be thrown directly on the roots in filling the holes.

To facilitate the planting, provide a "tree-setter." Take a board five feet long, four inches wide, and one inch thick, with a hole in the center and one at each end, in line with the center hole, and at equal distances from the center. Then cut a piece from one side of the board, marked by the square, the corner touching the middle of the center hole. Make two pins, each a foot long, and small enough so they will work easily in the end holes. Place the center of this board against the stake where the tree is to be set, push the pins into the ground through the holes in the ends, lift the board and lay it aside and dig the hole. When it is dug replace the board over the end pins in its former position. Then set the tree with its stem resting against the center of the board and at about the same depth in the ground that it was in the nursery.

Tree planting should be carefully done, but the work can proceed rapidly if the soil be mellow and the men work well together. Instances are given in horticultural works where a man has planted one hundred and twenty-five trees in a day. Two men work together at a great advantage, using the "tree setter;" each one takes an end and as soon as the center incloses the stake the "setter" pins are pushed into the soil, the "setter" laid aside, and the two men begin, first around the outside of the hole, throwing the surface dirt on one side of the hole, leaving the tree stake to be thrown out last, so its remaining serves to center the hole. Then the lower soil is thrown to the other side, and when the proper depth is reached, the bottom soil is loosened to the depth of the shovel. Now a shovelful or two of surface dirt is thrown in the center of the hole, the "setter" is replaced on the "setter pins," one man holds the tree in the center notch, while the other shovels in

the surface dirt, at first slowly; the man who holds the tree pulverizes and pushes the dirt among the roots, the other throws in the dirt until the roots are covered, when he steps in the hole and presses down the soil by tramping around the outside on the ends of the roots, and then sees that the tree stands erect. Then they both fill the hole, leaving the surface pulverized and not tramped down, unless the soil is very light.

#### GENERAL SUGGESTIONS.

All mangled roots should be cut back to sound wood before planting, and the ends of all big roots should be cut with a smooth slope before planting.

Place the strongest roots against prevailing winds.

Don't haul your trees from the nursery with the roots exposed to the wind and rain, nor in planting leave the roots for several hours exposed.

Don't dig big holes to fill up with water and drown the tree.

Don't let the tree peddlers humbug you about new varieties.

Don't put any manure under or on the roots of your trees in planting, whether rotten or green, for it will cause them to die when the hot season comes on. Throw your manure on the surface and it will act as a mulch to keep moisture in the ground.

Cut your trees back at planting to two or three feet, so as to balance the top and the roots.

Don't try to make your orchard produce hay, grain, or vegetables, but fruit. You will do pretty well if you can succeed in persuading it to do that liberally.

Let me repeat the advice—plant no trees more than one year old.

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## WHAT FRUITS ARE GROWN IN OREGON?

BY E. W. ALLEN.

This question is often asked of an Oregonian traveling in the East, and it is usually asked with the expectation of its being answered about the same as if asked of one living in Minnesota, for it is hard to disabuse the mind of the ordinary person who has never lived in Oregon, that a place 45° north latitude on the Pacific Coast is not subject to the same degrees of temperature as the same latitude east of the Rocky mountains, and therefore our interrogator naturally looks for the same results in the various crops produced; and this impression clings so tenaciously to the average

mind that even those who have lived here for a quarter of a century do not fully realize the capabilities of Oregon and the real difference that there is between the question as asked at the head of this article and what it would be if the *are* were changed to *can be*, even after forty years of experimental progress.

Answering the question, then, "What fruits are grown in Oregon?" does not by any means answer the question, "What kind of fruits can be grown in Oregon?" for I believe there are still greater surprises in store as to what Oregon can do than as to what she is now doing or has done. It was demonstrated at a very early day in the history of Oregon that here is the natural home of the apple, and so rapidly did this knowledge gain ground that she soon became known by the sobriquet of "the home of the big red apple." Here were found combinations of soil and climate that produced the greatest attainable results in the planting of an apple orchard, not any special variety selected for its hardy or other peculiar qualities, but of all varieties. The varieties produced were therefore only limited to those that were desirable or could be obtained.

Closely following upon the production of the apple came the pear, the cherry, and the plum, and many of the smaller fruits, such as the strawberry, the raspberry, the currant, and the gooseberry.

It was very soon found—that equally surprising and gratifying results were attained in the production of all these. Later experiments have demonstrated that still more surprising results have been attained in the cultivation of the prune than were even those given in the apple orchard, and because of which, as before stated, Oregon has been styled "the home of the big red apple." I believe in the near future she is to be recognized as the citadel of the peach, apricot, and nectarine, and grapes may be grown with success and large profit, and sufficient has been done to warrant the assertion that in favored localities the fig, the pomegranate, the medlar, and the persimmon will grow and ripen to perfection. In short, it can be said that, excepting the citrus fruits, all others can be grown with profit in at least some portions of Oregon. One point, however, needs to be emphasized right here, and that is, that no list of the fruits grown in Oregon—although that list contains nearly all that is desirable outside of the citrus family—can convey to the person who has not seen them in their mammoth proportions, and tasted of their lusciousness, an idea of what fruit grown in Oregon really is. The manner of its growth has ever been to me a continued source of study during my residence in Oregon. There seems to be some combination of climate and soil that not only brings the tree into early bearing, but also furnishes the needed qualities that not only enable the tree to continue its fruitage, but

to do so in the most prolific manner possible, and to that extent as to endanger the life of the tree by being literally crushed to the earth with the weight of its fruit.

While the natural conditions are thus favorable for growing fruits in Oregon, the fact still remains that here, as elsewhere, the best results cannot be attained except by complying with the same principles that are requisite for successful fruit growing in other less favored localities. That these essential requisites have been largely ignored by the average fruit grower in Oregon will account for the present condition of a large proportion of our orchards, which are not producing the fruit that they would under proper care, but are simply illustrations of what the climate and soil will do here in this favored locality despite the utter disregard of all the true principles of fruit culture. It can be truly said, however, that we are in the midst of a great revival in fruit growing, and not only are large orchards being planted, but more attention is paid to the selection of those kinds and varieties that will yield the best results from a commercial standpoint. We are also realizing that the most successful orchardist is the one that is largely a specialist. Thus it is that large prune, apple, pear, and peach orchards are being planted in all parts of the state. Some are planting two kinds, as in the case of J. H. Stewart, in the Rogue River Valley, who has set some 30,000 trees, about equally divided between apple and pear. Others are setting equally large numbers of prune and peach, and again others are combining on the apple and peach. While the principal fruits grown for the market will be prunes, apples, pears, peaches, and cherries, other fruits will be grown in great abundance, and in such quantities as will supply not only the home demand, but such other demands as may be made upon them.

It can, therefore, be truthfully claimed that Oregon offers to the fruit grower a wider range of latitude in fruits successfully grown than any other State in the Union, and we think, than any other country in the world.

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## CULTURE AND PRUNING OF THE PEACH.

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By M. SCHEYDECKER.

The peach (*Amygdalus Persia*)—*Persica Vulgaris*—is a native of Persia. There are innumerable varieties of this delicious fruit, to describe which would consume more space than is at our disposal for this paper, and besides it is the culture of the tree that we are especially interested in at this particular time. It is more peaches

that we want rather than more knowledge of class or race distinctions.

As the profitable culture of the peach seems to be restricted to certain small areas in our State, it is evident the matter of location is one of the first to be considered; but as each planter must settle this question for himself, discussion on this point is omitted. If no previous plantings of the peach have been made in the locality under consideration, then it will be safe only to test its fitness by setting out a few trees first. This part of the subject disposed of, the matter of next importance is the kind of soil required.

Agreeable to its nature, the peach requires a mild, warm, light soil. This should be well prepared before the trees are set out, by stirring to the depth of at least two feet, and thoroughly fining it. Such soil as the above will be well drained naturally, but if it should be necessary or desirable to plant peaches on other soil, then see to it first that it is thoroughly drained. The peach cannot endure a wet, soggy soil,—no fruit tree can, for that matter,—it must have a warm, dry place for its feet if we aim to get good crops of fruit. Light, gravelly, stony, or calcareous soils will be entirely suitable, providing they are supplied with sufficient fertilizers.

If the planter can propagate his own tree he should do so. If pits of Madeline, Grosse Mignonne, or Admirable are sown, they reproduce themselves, while all other varieties need to be budded or grafted to insure varietal reproduction. As the above-named varieties are not yet introduced into our local nurseries, we are confined to the planting of those varieties which need to be budded. This operation is usually performed during the latter part of July and August. The exact time will depend on the climatic conditions of the season and the maturity of plant growth. The buds to be used must be ripe and the bark on the stocks must slip easily.

The most desirable stock for the peach is the hard-shell sweet almond. This grows vigorously in dry and calcareous soils, and even in the most rocky and sandy soils. It is also preferred to all other stocks because it is the least subject to *Gummosis*, or Gummung—*Coryneum Beijerinckii*—a fungus disease sometimes very disastrous to peach orchards. The almond-peach may be used to advantage as a stock for shallow soils, while for moist soils the St. Julian plum should be used.

In case commercial trees are to be planted, the best should be procured. Take the choicest trees that can be procured in the fall, for the very best to be found in the spring will be only second or third grade compared with first choice selected in the fall. The extra money put into these trees will be fully returned in the first crop of fruit. In no instance should other than first-class trees be

planted if the best results are to be reached. Plant in the fall, but do not cut back. What distance apart to plant the trees is a mooted question. But if climatic and soil conditions are favorable, and proper culture is given, they should be at least twenty-four feet apart each way. All roots should be given a natural position and well spread out at the time of planting, care being taken to cut off all that are bruised or injured. Firm the soil as it is placed around the roots and leave the surface immediately around the trees a little higher than the general surface of the orchard.

The cultivation of a peach orchard should be most thorough. No grass or weeds should be allowed to grow at any time. Clean, mellow soil not only encourages a more vigorous growth of the trees, but it also prevents the accumulation of rubbish that would serve to harbor noxious insects. By plowing once in the spring and then giving frequent stirrings with the cultivator the soil ought to be kept soft and clean.

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## PRACTICAL DRAINAGE.

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By F. J. BEATTY, Chemawa, Oregon.

I herewith give you a little of my experience with tile in my orchard. To begin with, can you or anybody else show me a person that has tried tiling a field and then given it up, except for lack of funds to go on? I put in 1,500 feet the first year, 3,500 feet the next, 6,000 feet the next, and the past winter and this spring about 16,000 feet. Any one can see the benefit of drainage, and nearly every one does; but many are deterred from using tile by such statements as I saw in a farming paper recently about tile costing \$60 per acre. Now, it need not cost one third of that sum, even if everything is hired done, and any farmer who has a mind to try can, with the help of a hired man, put in a lot of tile every spring at a very small advance on the cost of the tile, which will be from \$8 to \$12 per acre. The best time to dig for tile is just about the time a farmer is done with his spring seeding in May, when the ground is dry on top and just a little water in the ground to show the levels. I plow out so the dead furrow is where I want the line of tile. This will put out about ten inches. Then one furrow turned out as deep as possible in the bottom of the dead furrow. This will make a total of about eighteen inches from surface; then throw out the loose dirt left in the furrow, and if there are any high points cut off a little with shovel. Then with a tile spade (twenty-inch) cut the ditch as narrow as will let the tile in that you wish to



use. This can be cut and bottomed for about \$1 per hundred feet, using a tile hoe to make the tile lay snug so they will not rock about. I only use two sizes of tile hoe; the three, two and one half, and four-inch tile can be fitted with the four-inch hoe. This will bring the cost of tiling every four rods to about \$16 to \$20 per acre, using two and one half and three-inch tile, thirty-eight inches deep; forty to forty-eight inches is better, and by plowing out twelve inches deep; then use eighteen-inch spades and cut the upper spade eight or nine inches wide at bottom and the next one to fit the tile, or three and four inches wide. It is not even necessary to get in the bottom of the ditch, as the tile hoe will make the bottom, and the tile hook will put the tile in place from the top.

Now as to the grade. If you can get one inch to the rod do so, but if there is one inch fall in half a mile and a free outlet, it will work perfectly. Of course, there must not be any holes in the line where it is below grade, as it won't work long. If there is a little water in the ditch it is very easy, after a little practice, to hoe out the bottom so the water does not get any deeper as one goes back, and thus keep the grade. Of course, if one is rich enough to hire an engineer to lay out the grade, it is a little better to have it uniform the whole length of the ditch, but the average farmer can get along with the water level. I think it will pay any one to hire a regular expert tile ditcher, even at \$5 per day, to put in a few lines and see how he does it. But don't take the first one that says he "knows all about tiling"; ask him for a few references first. One man came to me this winter for a job of tiling—said he had worked at it thirty years in Illinois and Indiana. I was putting down four-inch tile fifty inches deep, and the ditch was twelve inches wide at the top. He stood and looked on and talked while I worked, and soon asked me what that "thing-a-my-gig" was, pointing to my tile hoe. I told him what I called it, and thought it a little strange that he did not know. Pretty soon he asked me how I got that ditch so "thundering deep and no wider?" And then I made bold to ask him if he had ever put in any tile. "Oh yes; miles and miles of it." And yet he did not know anything about a tile spade, hoe, or hook. The same man got employment of a neighbor ditching, but I did not give him any job.

My eleven-acre prune orchard cost me \$225 to tile every sixty feet, forty inches deep, with main fifty inches deep across the north side. The main is of five, four, and three-inch tile, and the laterals three and two and one half; grade about one inch to the rod on main and half inch on laterals. I paid thirty cents per rod for cutting two spades deep below my twelve-inch dead furrow in heavy clay soil, forty-eight inches in all from surface. They wanted five

cents a rod for filling up the ditch, but I figured out a Yankee trick to fill by horse-power, and filled up 150 rods per day. I first went up on one side and down the other with one horse and a 14-inch plow, set over as far to the right as possible. This round of furrow all fell in the ditch. The next round was followed by a scraper which I made of one two by ten-inch plank for a land side, and a one by twelve-inch board joining to it in front and spreading out about four feet and ten feet long for a wing. One horse would walk right along with this, and three rounds would do the business. Cost, about one cent per rod or less.

One can lay out a system of drainage and put in a main and as much of the laterals as possible each year, and thus get an orchard or farm thoroughly drained at a very small money outlay per year, and it pays, with a big P. It is astonishing to see the difference it makes in the sub-soil of our heavy clay lands. The ground soon gets porous and warms up sooner in the spring, and can be plowed as soon after a rain as the sandy river lands. It will hold more moisture for the use of trees and plants in the dry season, because it is porous instead of solid.

Tile will change the poorest of our "white land" into the best land on the farm in a year's time. I might talk a year about the benefits from tile, but if any one wants to see it, come up and take a look at my orchard and compare it with others of the same age around here.

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## THE FUTURE OF HORTICULTURE.

By REV. D. E. LEVERIDGE, Eugene.

The ancient kingdoms of the world lay beneath a warm sun—for man naturally loves sunshine. The first cities were built far away from mountain snows and shades, beneath clear, deep, blue skies and along sunny rivers. The first cities were built before markets could be formed or opened. Those cities could not live by hunting or migratory herds. They must find, as markets were not, their own provisions in themselves. They could exist only by virtually turning all the surrounding country into continuous gardens and orchards. That they did. Bright suns and long summers were willing servants. They located their neighborly habitations along broad rivers. These rivers were fed and swollen by the abundant rains and snows of remote elevations. Their waters brought down to the city plain-dwellers the soft, rich alluvium of distant mountain fastnesses. Bright skies, long summers, abundant waters—these

God in nature supplied. Man's hand turned to labor. Where heaven's gift of plentiful sun and water meet with human industries, irrigation can turn even a desert into a Garden of Eden. There was corn in Egypt when over the extended hills and valleys of Palestine there was only brazen sky above and starvation beneath.

Thus the ancient cities lived and thrived and became mighty in renown, mainly by gardening and orcharding. Science, art, philosophy sprang first into being beside the mess of pottage, and under the odorous shade of orange or beside luscious grape and fig. Bright suns kept them warm. So, few meats and not much fat were needed as fuel for the inner furnace. But restless ever has been mankind. Distance has ever enchanted his view. In his midnight dreams, over the hill or across the broad plains has he ever been seeing better lands and deeper content. Thus colonies wandered and spread. Pilgrims of hope, victims of restless dreams, grasped the staff, tied around the scrip, girded their loins, and ran to find treasures and happiness beneath rainbow ends. Soon their scanty scrip gave out and then they must hunt and fight beasts or starve and die. Hunters and herdsmen they soon became. They ate out the carcasses of the beasts they had slain and clothed themselves with their skins and slept in them. So by day and by night they were after the similitude of beasts—human bears, or wolves, or tigers standing on their hind feet. But from these migrations cities began to rise under cloudier skies and in severer clime. The diet of these cities was chiefly grain and meat; garden and orchard supplied but a small portion of their food. Their markets thus differed from those of the earlier cities, where fruits and vegetables were prime necessities. Our Anglo-Saxon forefathers lived largely on poor but sweet bacon and beef, with which our modern teeth would struggle in vain, but to which the vigorous, well-rooted and uncivilized "ivories" of the past were equal. They killed their beef running, and then with over-much fire generously supplied what it lacked in native toughness. Fruits were rare and poor, scorned by the manly appetite and left to women, who, of them, with perverted art and abused fire, compounded villainous sweetmeats, and with sleepless nights and disordered brain paid the penalty of extraordinary genius.

Thus our forefathers dieted. As our eye rests upon the dials of the past and marks the indexes of advancing civilization, we mark that the culture of garden and orchard has kept abreast with the broad line of advance in the march of improvements. Fruits and flowers are no longer on the sideboard of luxury and taste. They adorn and bless the deal of the cottage as well as the mahogany of the palace. They have been moved from the vase of solitary parlor to the presence of constant smile and favor, or taken down from the upper shelf of luxury to the lower shelf of daily "necessary."

Chemistry, which in modern times has brooded with such marvelous creative power over all the broad field of human activities and enterprise, and has led on to high achievements and chivalric deeds, and has converted many a chaos of darkness and disorder into realms of beauty and happiness, has with her very best gifts, "common sense in common things," taken her friendly seat on the kitchen hearth, and with her magic wand has converted the preparation and use of fruits from a perverted talent into a converted blessing; and to them that are wise this becomes the doctor that calls promptly and pays his own bills. Rapid transit, easy passage, ships constantly weaving their webs over all seas and oceans, railroads cutting up continents and islands into all manner of geometrical figures, opening up new empires, subduing wildernesses, destroying old towers of babel and reconverting the confusion of tongues into one language again, are making one nation of all the tribes of the earth, or rather one humanity.

Tropical fruits crowd our markets and bring their distant sunshine to our wintry shores, and our northern fruits descend to the hot tropics and carry their freshness and coolness with them. The supply stimulates the demand. As rapid as has been the advance of man in the last fifty years on all the lines of material enterprise and development, so rapid has been the increase and advance in the culture of garden and orchard and in the consumption of the fruits thereof. Fifty years ago neglected corners mainly indexed the world's estimation of their products. A few small coasters freighted them from market to market. Now; vast lines of mighty ships and steamers hardly suffice to keep the markets supplied. States, and not corners, are demanded as room for man's first occupation; and for the future we can hardly dream dreams or see visions large enough for the reality of horticultural and pomological interests. A mighty empire awaits their ambition. It is not difficult to see the causes and influences at work which will advance them more rapidly in the future than in the past. Our great and generous Uncle Sam has divided up his vast landed estate to those who from every land and clime have sought his favor and blessing. But comparatively little remains. Then must come divisions of estate and higher culture. Meats need room—large ranges. Vegetables grow in close fellowship. But food for man which grows on the hoof needs much room; and like Quakers who have lost the grace of their first love, insist more upon the "mine" than upon the "thine." You must handle your weights a good many times before you can weigh the product of a single acre of good fruit-bearing vines or fruit trees. You need handle them but once to weigh the hoof-food that the same acre will yield. By the natural

laboratory of lacteal veins you can convert the grass yield of an acre into butter and cheese, and store the product in a small closet; but you will need a large upper and lower room to store away the yield of the same acre in vegetables and small fruits. So, as the lands fill up and houses stand in the field and country within neighborly hail and greeting, the inevitable drift will be that more and more fields will become innocent of cattle tracks and full of green low tops, sown and grown by the sweat of the brow, or luscious fruits bright with the glory of summer and rich in the juices of autumn.

Another influence is working still more strongly to rapidly increase the acreage of garden and orchard. Our cities are crowding their populations. Diet is learning. Food knowledge is improving. It is found, and will be more and more found, that sedentary habits and indoor occupations do not require so much meat. Meats overmuch tend to throw the system of such toilers into a triple and needless biliousness—biliousness of the system, of the butcher, and of the doctor. Fruits are the charitable friend who comes in just in the needful time of trouble and pays off this heavy triple biliousness with a few pence he has picked up in your own door yard, and leaves you bright and cheerful with your hearty wish that he may come again and do likewise. We all know the natural craving of children for fruit. Their craving is a wise teacher, and serves without fee or reward. Let them have all they want, so it be ripe and fresh, and throw physic to the dogs, though dogs have too much good sense to take it.

City markets, in their teeming abundance of fruits and vegetables, present in our day a very different scene from what they did fifty years ago. Fruit is no longer a luxury; it is a necessity. The poor buy it as well as the rich. Less meat and more fruit is more and more the dietetic tendency. Take my own experience. A few years ago my annual fruit bill represented no great diminution of my purse, but now it lags not far behind my meat bill, and sometimes threatens to overtake it. What is true of mine is true of multitudes of families in the land. The grape-growers of that now best known grape region in the East, that of Keuka and Seneca Lakes, this last year marketed the abundant yield of 20,000 acres more readily than twenty-five years ago they marketed the scanty yield of fifty acres, so rapid has been the increase in demand; and in untold numbers of villages carloads do not better respond to the demand for small fruits than not many years ago did a few bushels. The prospect of the future is that of a still more rapidly increasing demand. Our cities will soon present the prospect of the cities of old standing in the midst of a mighty spread of garden and

orchard. So rapid is transit, so cheap is freight, that all the country surrounds the city. So let the movement go on. Let experiment and observation gird their loins and run and look on all sides, and prove, and learn, and tell the best kinds of fruits and vegetables, the best modes of culture, the best manner of use and preservation. It will be money in the pocket, health in the body, comfort and pleasure in the home, gladness in the eye of the mother, and smiles on the fair face of child and maiden.

We recur to a point on which we have already touched—that is, the drift of population to cities. This drift is rapid and heavy. Cities are consumers, not producers; the more population becomes crowded into cities, the more consumers outnumber producers, and the larger becomes the proportionate draft on orchards and gardens. But a still more important feature in the problem is the dietetic change that has been going on in later years. Not so long ago most people regarded money expended for fruit as about no good, nearly waste, weak indulgence of appetite; now the wise know it to be a most profitable investment for both food and health, and this wisdom will spread. Nor must we overlook another feature in the problem. Carelessness is a sore natural defect in our poor human nature. Thousands will still imagine that all they have to do is to set out a tree and then leave it to its own sweet will, which shortly becomes anything but sweet, and the husbandman soon experiences the fate of the scripture husbandman—he comes seeking fruit, and for three years or more finds none. Moss covers the limbs and abundant pests find congenial homes, increase, and multiply. So many acres have the form of orchards, but almost utterly deny the due productiveness and certainly profitableness thereof. We reach then this conclusion. Orchard life is no exception to the common rule. Carelessness and the sluggards will win no prize. The demand for the product of the orchard and garden has a good outlook, but only the wise, diligent, careful, good workers, and fighters will gain the victory; but moss on the back and moss on the tree will turn Eden into a desert. Doubtless here in Oregon the battle is before us. Carelessness must gird its loins; it must have the sword in one hand and the pruning-hook in the other, the plow at the feet, and the syringe over the head, and sure we are that the diligent and faithful will by no means find their labor in vain, but healthful, pleasant, and profitable.

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## MARKETS FOR NORTHWEST FRUITS.

By A. T. HAWLEY.

The above caption suggests a subject of paramount importance to the horticulturists of the Northwest. The *Rural Northwest*, in its issue of May 1, 1892, contained an article from the pen of Mr. A. H. Carson, of Grants Pass, in which the "Science of Fruit Evaporation" is presented from an intelligent and thoroughly practical standpoint. Let me reproduce here Mr. Carson's primary proposition. He starts out by saying: "The area of country that can be made available for a market of green fruit on the Northwest Pacific Coast is large. But the great producing capacity of our orchards, now in bearing, and the young orchards that will come into bearing, in two or three years, will be such, that after supplying the demand for green fruit, we will have a large surplus to prepare and find a market for. The question now for us to discuss is, in what way shall we prepare this surplus so as to reach distant markets, at prices that will pay the producer?"

This is very well as far as it goes. But it hardly gives even a glimpse of the vast opportunities and possibilities in the direction hinted at. I had occasion some time since in the course of compiling data for letters written for the Board of Immigration of this city and published in the *St. Paul Pioneer Press*, *Frank Leslie's Weekly*, *The American Farmer*, and other leading Eastern journals, to look closely into the work of Oregon orchardists and nurserymen. I do not profess to be familiar with similar work in Washington. Three years ago, as one of the results of my investigations, I said in an article on this subject contributed to a local journal, referring to the recorded sale of peach pits by local firms to be planted for grafting stock of peaches, prunes, and plums, "allowing a loss from natural causes of one fifth of this immense planting it represents four million peach, plum, and prune trees to be added to the productive forces of this State within the next eight or ten years." This statement did not take into account the immense numbers of apple, pear, quince, and cherry trees which at that time were already planted in the orchards of Oregon, and to which constant additions are being made. Nor does it by any means include the immense number of plantings which have been made since the article quoted from was written. Seedsmen inform me that the sale of peach pits, instead of decreasing, increases from year to year. If we multiply

my estimate of four million peach, plum, and prune trees, made three years ago as the probable orchard growth of Oregon in the next eight or ten years, by three, or even by four, I do not think the estimate will be above the mark. It is more likely to be under it.

Can the importance of the problem as to where and how profitable markets can be found for the immense output of our orchards be over-estimated? There can be but one answer to this question, and that must be in the negative.

Premising that the establishment of permanent, satisfactory, and reasonably remunerative markets for our orchard products must absolutely hinge upon the excellence of our goods—upon their uniform excellence—the question arises, Where are markets to be found? Let us look at the facts as they exist. It will do no good to shirk the recognition of existing facts. Up to within the past three or four years Oregon fruit-growers, even with the then sparse population of the Northwest, found little difficulty in disposing at fairly remunerative prices of their surplus crops. But the times change and circumstances change with them. Railroads have made us next-door neighbors to the States of the East, the West, and the South. Railroads have opened vast regions in those sections to the fruit growers which are admirably adapted to their purposes. The grape crop of New York is of greater pecuniary value than that of California, strange as it may seem. The peach crop of the region of the great lakes is challenging supremacy with those of New Jersey, Georgia, and other sections which once considered themselves masters of the situation. Middle and Northern Arkansas and portions of other Western States are coming to the front with apple orchards which not only rival but surpass the world in extent and productiveness, as well as character of product. Three years ago Charles Juste, a leading fruit dealer of California, said, "There is an imperative need of a market for California fruits."

At the same time A. Lusk, whose name is familiar to every grower and dealer in fruits on this coast, said, "I know there is a sad need for a market for our fruits." Quite recently Wm. H. Mills, a tireless and energetic worker in advancing the pomological as well as all other interests of California, finding the need of more extended markets imperative and challenging immediate attention, put forth a "feeler" in the direction of establishing, in addition to the quick time fruit trains between San Francisco and New York and Chicago now running, similar quick time fruit trains between San Francisco and St. Paul, Minneapolis, Omaha City, St. Louis, Denver, and, in fact, all cities, including the smaller ones, on the route from the West to the East. The experiment of rapid transit from the Pacific Ocean to the great European centers is now being made. Our



readers will see at a glance that the question of "Markets for our fruit" is "a burning one." It is time for the Northwest to be up and doing in this direction. It is time, high time, to take a calm, cool, dispassionate, determined view of the question, and more than that, to take action. Supremacy, equality, even, in the great contest, is not to be won without prompt, persistent, intelligent effort. Set that down as a foregone conclusion. We may sit like Jack o'dreams and prate till the world's end about the fertility of our soil, the excellence of our products, the size and lusciousness of our peaches and prunes, the gleam and glimmer of "the big red Oregon apple," but as sure as you are born, "chin music" won't bring the markets of the world to our doors. An old proverb is to the effect that everything comes to him who waits.

This may be a rule, but there is no rule without an exception, and in this case the exception is at hand. It is a palpable entity, as much so as a wart on a man's nose. It cannot be brushed away like a fly on the rim of a tumbler. It is here to stay, to challenge scrutiny, to suggest action.

This action must take many shapes; travel and display of goods and wares, which will cost money, and for which perhaps, indeed most likely, no immediate return can be expected; that honest and honorable local and State and commercial pride, which will be content with nothing short of a profit to the buyer, whether he is found at the East, or in Europe, or Asia, or the Isles of the Sea, of first-class goods, true to the label and of uniform excellence in the package, top, bottom, and sides; and this action should take further the shape of coöperation among fruit growers on the part of whom there should be rigid insistence upon fair dealing upon the part of fruit canner, fruit dryer, and fruit packer. There should be a league among the fruit growers on this particular basis so strong that no one of them all would dare to bring reproach upon this section by putting a poor quality of fruit upon the market. In this direction, and this alone, lies the hope of either supremacy or equality in the markets of the world. The few tens of thousands of tons of fruit now harvested annually in the United States are but as the dust in the balances to the products in the near future of the orchards now planted and yet to be planted. There is no use gainsaying this fact, and out of this significance grows the all-important significance of the subject of "Market for our fruits." We have a population of sixty millions and more of souls now, and already, with the comparatively small area planted in fruit, the question of "markets" for our orchard products is pressing upon us.

Judging by the work done in this direction in Oregon alone, the acreage in fruit is increasing in a ratio greater than the increase in

population. Such being the case, the question of "Markets for our fruit" addresses itself with clyconic force to the intelligence and enterprise of the fruit growers. Intelligence and enterprise can find a satisfactory answer to the question, at some present cost perhaps, but with liberal remuneration for the future. But supine waiting for the verification, in this case, of the wise saw, "Everything comes to him who waits," will result in a dead, unhappy failure. To be up and doing is the need of the hour.

In the consideration of this subject, one of paramount importance, it must be apparent that it is absolutely necessary, in order to arrive at any just or satisfactory conclusion in the premises, to take as comprehensive a glance as possible at not only what has been done, but at whatever has been suggested in the direction of finding a market for the surplus fruits of the Northwest.

Assuming, therefore, that something, even if not a very great deal, has been accomplished in the way of introducing our fruits, green, (or, more properly speaking, ripe as they are taken from the tree,) dried, canned, and preserved, although not half has been done that could and ought to have been done in the markets of the United States, let us look at the suggestion of localities into which these fruits may in time and ought to be introduced.

First, as to Asiatic countries, China, Japan, and others. There have been some few shipments to China *via* the defunct Upton line of steamers. It is unpleasant to record the fact, but I am reluctantly forced to confess that attempts upon my part to obtain satisfactory data upon which to base reliable conclusions as to success and profit of such shipments have been baffling, to state the case mildly. Still, on general principles, it may be stated that the attempts to establish a trade in apples, more especially with those countries, would not have been made if the inducements held out had not been sufficient to warrant the experiment, and it is not unreasonable to infer that given reliable and reasonably rapid means of transportation to those countries there is in the future—perhaps the near future—the promise of reasonable profits to the orchardist who grows good, clean, merchantable fruit, and prepares it attractively for the buyer.

In this connection it may be remarked that a few weeks ago a writer stated in a letter to a Pacific Coast journal that, having recently dined at a table of some Japanese gentlemen of high rank, he was agreeably surprised to note that as the crowning delicacy of the feast the guests were asked to partake of canned California peaches, pears, etc., and that they were brought to the table with much pride, pomp, and circumstance of display as a luxury. The fruit-grower of the Northwest may, and should, if he is wise, regard

this incident as full of encouragement to the man who is now engaged or who may hereafter engage in the work of an orchardist on correct principles. For, once let the swarming myriads of those regions become inoculated with a taste for Pacific Coast fruits and the demand therefor will mean remunerative markets "beyond the dreams of avarice."

The suggestions, however, are valuable only as containing within themselves the germ and promise of hope and value for the future, but nevertheless should be filed away for reference. The person doing so should not forget to keep a weather eye upon the developments of trans-Pacific steamship lines, for therein may lie the secret of great rewards.

It has been suggested that at some time our Australian brethren may become customers for our fruits. It will not do to build up any extravagant hopes in this direction. In the *California Fruit Grower*, of October 8th, I find a *resume* of the estimates of 79 fruit growers, representing 1,130 acres of orchards in one section of Australia, that of Angostan, from which it appears that apricots, peaches, pears, plums, apples, nectarines, quinces, cherries, berries of all kinds, and tropical fruits, oranges, lemons, figs, walnuts, and almonds are successfully grown there. Another writer, on the same subject, says: "In the markets of Brisbane, Australia, great quantities of fruit are said to be given away daily to the street Arabs by the marketmen who prefer that means of disposing of their surplus stock to the trouble of hauling it home again, or the more selfish method pursued in San Francisco of dumping the unsold overplus into the bay." It seems evident that the Brisbaneists have not yet learned the knack of canning or drying their fruit, but they will do so, and that from their own neighbors, for within a short time the California State Board of Horticulture received a loud call from the Australian Board for a man thoroughly conversant with the art of canning and drying fruit, and able to travel about the country and by public speaking instruct the people in this important industry. Manifestly, we of the Northwest, are not to look to Australian neighbors for purchasers of our orchard products.

But west of us, across at least a portion of the waters of the great ocean which lies at our very doors, there is a vast, a practically untouched, so far as we are concerned, region which I think contains within itself the potency of great rewards to the Northwest fruit-grower. At a convention of the National Board of Trade Association held in Washington, D. C., in July, 1892, Mr. J. A. Hazeltine, of this city, read a paper in the course of which he said (his subject being the importance of our Government fostering the trade of the United States with the Asiatic countries and the Isles of the Sea):

"There are other regions accessible to our merchant fleets, the trade of which should fall to us, but which without action on our part must go by default to a more enterprising people." Judge J. G. Swan, of Port Townsend, Wash., a well known writer, in an able disquisition on "The Amoor River," says: "The development of the commerce of Siberia, Manchooria, and Mougolia, drained by the Amoor, has engaged the attention of Russian and American statesmen, and far-seeing men predict that the development of this commerce must produce as great a revolution in the commercial world as did the discovery of the passage to India by the way of the Cape of Good Hope"; and Judge Swan, after a lengthy discussion of the subject, reaches the conclusion that "when the channels of that trade are fairly opened to articles of American manufacture and American products generally, there will be consumed an average of two dollars worth by each inhabitant, which will open a market for one hundred millions of dollars' worth of American products"; and Mr. Hazeltine adds: "This is one and only one of the features of the splendid commercial panorama which the intelligent observer sees open before him as he looks upon the mighty ocean which laves the rock-bound shores of the wild West."

Now, a hundred millions of dollars worth of new trade is a plum worth looking after. It seems large,—the prediction of its development smacks of Quixotic, of Colonel Sellers like extravagance,—but really in the light of this nineteenth century, and what has been accomplished in less than 100 years, it is not a whit more chimerical than it would have sounded if Lovejoy and Pettigrew had said when they tossed a coin to settle the name of the city of Portland, "Here, where this forest stands, will be built up in forty years a city of 80,000 souls." I say this, granting that the trade of the Amoor River is opened, it is not only possible, but more than probable that the fruit-growers of the Northwest will find an exceeding great reward. Those fur-clad denizens of Asiatic Russia will be clamorous for the Northwest apple, pear, prune, peach, and grape, green, canned or dried. The Northwest will have the whip hand in that drive for trade. Let the young man who is planting his orchard of one, five, ten, or twenty thousand trees for himself and heirs bear this in mind.

As for myself, I have long since ceased to be visionary and enthusiastic, if I ever was, on the subject of extraordinary profits in fruit-growing, except in occasional and abnormal instances, a few of which occur here and there and now and then. I have worked too hard in my younger days in orchard and garden to be deluded by vain dreams in this direction. I look at these matters in the cold, calm, clear light of study, observation, and experience. I do not see bank and store and other money-making institutions

emptied of their coin to be put in orchards paying seven or eight hundred per cent on investments in fruit-growing, which would be the case if half the stories afloat or half the promises made were true. But I do know that given industry, intelligence, and fair dealing, and reasonably good prices in permanent markets, there is good money in the business; and my present business is to point out in a spirit of fairness reasonably good markets, present and prospective, to the best of my judgment, and to warn others against relying upon false hopes. I look upon the region last named as promising fairly for the future.

Immediately north and northeast of us lie the State of Washington, Alaska, and the British Possessions. It is entirely safe to say that the virile, intelligent, and energetic horticulturists of our sister State are going to call into active play, to their utmost, all possible means to make that commonwealth one of the great fruit-producing States of the Union; and whether, in this particular regard, Oregon and Washington will have the right to inscribe "First among equals" upon its escutcheon, is a question which will only be decided after a long contest between Titans. But I am discussing the subject of future markets for the fruits of the Northwest, and do not propose to be led into drawing invidious comparisons.

But no presentation of this subject can be complete without glancing at what Alaska offers in this connection. The great Webster, if I remember correctly, once sneered at the proposition to secure the Oregon region, then comprising what is now several States, as unworthy of serious consideration. We all know how far he was from realizing what the future of this great region was to be. Seward's purchase of Alaska was not less the subject of ridicule and objections born of lack of knowledge; and yet the purchase money which was expended for the almost continental expanse of Alaska has been more than repaid by the royalties paid on the skins of one of the Amphibia; and her mines, forests, and fisheries are practically as yet "undeveloped resources," in the exploitation of which great populations are to become purchasers and consumers in large amounts of fruits, green and dried, probably far more of the latter than of the former, although these last named will form in the course of the next ten years, if not sooner, a by no means inconsiderable demand upon the yield of Northwestern orchards.

And there are, and I wish as forcibly as possible to impress them upon the minds of Oregon and Washington fruit-growers, cogent reasons why every possible exertion should be made now in the infancy, so to speak, of the great trade to spring up in this direction, to introduce their products of the best class into this region; to "keep them before the public"; to see to it that the possibilities

so rich in promise are not made of no avail by the dumping upon the buyers and consumers of fruit in that region of inferior orchard products by unprincipled dealers.

Let me state one of these reasons which comes directly home to our local fruit-growers. A very able journal, devoted to the interests of the fruit-grower, under the caption of "Horticulture Gaining Ground," remarks that this honorable and delightful occupation "is moving forward far more rapidly than any other rural pursuit." I shall quote directly a little more from this timely and interesting article. In naming those regions where the business has recently received a tremendous impetus it omits to mention one section of the habitable globe which closely touches and concerns us of the American Northwest.

Said a wholesale dealer in fruits in Portland to me recently, among other things: "Our people seem to be unaware that in British Columbia, between the Cascade Range and the Rocky Mountains, there is, or there is claimed to be an immense area, admirably, if not exceptionally well adapted to fruit-growing, especially apples, pears, prunes, and their congeners." I am led to believe that these propositions are correct. At any rate I am assured by a reliable gentleman who recently traversed that section, that an Englishman of great wealth who owns a tract of 40,000 acres of land is preparing to plant fruit trees by the thousands, has already secured the services of a thoroughly scientific orchardist and housed him comfortably for his preliminary work, although not a tree has been planted or even purchased as yet; "and this," added he, "is but an isolated instance of what is being done in this section, although perhaps there are few, if any, movements on so large a scale."

Now, the orchardist of Oregon and Washington in forecasting and preparing for the future "neighborhood trade" of this section will act unwisely if he fails to do all in his power by the production of first-class fruit, offered to the buyer in first-class packages, to establish his outposts and enlarge the borders of his trade with these outlying northern regions. For it is an issue, not to be, but already made, and it is one not to be shirked or evaded.

I have glanced curiously at the outlook for markets for Northwestern fruit so far as the trans-Pacific and western and northwestern coast is concerned. What I have presented are merely outlines, but in my opinion suggestive ones, which the orchardist may, with profit to himself, study and fill up at his leisure. Elderly men who like myself have passed the three score mark in the dial of years may not see train loads and cargoes of fruit in vessels dispatched to the regions pointed out, but the younger generation will, that is,

those of them who plant and cultivate and care for orchards as they should be planted, cultivated, and cared for.

Now, as to interior and Atlantic Coast American markets. It is very difficult to forecast the part that the Northwest is to play in this great commercial enterprise. The *California Fruit Grower* says: "The people of the United States are rapidly becoming fruit consumers, and feel a lack in any one of the lists of good fruits far more keenly than formerly." Herein lies, and largely lies, the hope of the Northwest fruit-grower. He who calls in question the capacity of the soil and climate of the Northwest to achieve a place and an honored place in the very front rank of fruit-producing regions begs the question, belies the record, and is no friend of an industry which has already done much for this section, but which is really no further advanced toward its possibilities as to development than a ten-year-old boy is advanced toward a perfect manhood, perfected physically and intellectually. It is hardly necessary to discuss the causes of this lamentable failure. Primarily it may be traced to "the flush times" of the genesis of fruit-growing in Oregon when the California miner would almost empty his plethoric sack of gold dust for a sack of apples. This lamentable "spurt in prices" taught men to despise the day of small things; and the next evil which laid and still lays its heavy hand upon this industry may clearly be traced to the absurd promises of immediate and phenomenal returns to fruit growers. The sooner this delusion is relegated to the limbo of exploded fallacies the sooner will men take hold of abandoned old orchards and half—nay, not half—cared for newly planted ones, and bring them to that point where health and home with a decent competence will be the almost certain reward of thrift and industry.

Let me cite two remarks I heard while in search of information upon which to base these papers. A Front-street merchant while conversing on the subject lifted the lid from a box of Winter Nellis pears, each one perfect, flawless, without sign of worm or aphid, rich beyond the painter's art in the beauty of their bronze. "These," said he, "are selected and graded pears from a careful, conscientious orchardist. Now," added he, "look here," and with a vicious jerk he ripped the lid off of another box; and I looked and saw a mangy lot of Bellflowers of good size, but codlin moth and aphid ridden. With a sweep of hand the fruit dealer swept off the top row of Bellflowers, and underneath there were dwarfed and scraggy things, some no larger than a good sized duck egg, and altogether repulsive to sight, as doubtless they would prove to taste.

I asked why such things were sent. "Well, sir," said he, "I kicked about it, and the grower said, 'Look here; I used to get 30

cents a pound for apples in this country; do you think I am going to kill bugs for a cent a pound?" Here was a case where the old "flush times" leaven was doing its deadly work. It is useless to talk about developing "markets for northwest fruits" on any such basis. For an instance in another direction take the following recital from the lips of another Front-street merchant, called out by a remark on my part as to the quality of fruit and style of packing by careless growers. "Let me tell you something," said he. "Last year (1891) was a fairly good fruit year. Apples were hawked around town at 75, 50, and 25 cents a box. My son went to Ashland, Oregon, and on his return told me he had purchased a large lot of apples at one dollar a box. Freight and charges made the cost \$1.35 laid down here. Later in the season some few boxes were sold at the latter price, when we put them up to \$1.50 and sold the thousand or more boxes my son had bought, and had orders for 700 more boxes at the latter price, which we were unable to fill." Here was the difference between the leaven of the flush days working in an old timer, and the result of improved methods of fruit planting as followed by a man who understood his business and attended to it.

[But this unfavorable showing should not be taken as characteristic of Oregon fruit displays in the general markets of the metropolis. Such ill-assorted lots as above referred to can be alluded to as usually indicating the extreme and reprehensible carelessness of growers, who, regardless of the duty they owe to the State in the direction of keeping up its reputation for fruit-growing, will, for the sake of a few paltry dimes, dump their shameful products upon the market, to be seen of all men, and bring reproach upon the State. A casual stroll among the family provision stores will, on any day in the fruit season, reveal a very great deal of first-class fruits of all kinds,—apples, pears, quinces, etc., well graded, and handsomely boxed, and displayed. Reference to the bad work, which has been made, ought to have the effect of reforming the disreputable part of the business in whole, not in part.]

The second remark I alluded to, for the last mentioned instance was interlocutory, fell from the lips of a gentleman who had spent many years in Eastern and Middle States' farms and orchards. He was speaking regretfully of the unthrift he saw in newly planted orchards while journeying through various portions of the State. Said I to him, "What proportion of the newly planted orchards that you saw appeared to you to have received and to be receiving that degree of care and attention which gave reasonable promise of becoming remunerative fruit producers?"

"Well," said he, "if one acre in ten, under the system of cultiva-



tion I saw reaches that condition I shall be surprised." His language was even more emphatic than the words I have put on paper. Here is the new evil leaven working again. Trees planted at heavy expense under the baneful stimulus of false hopes and false promises of phenomenal profits, and left to themselves to become gnarled, misshapen, pest-breeding trunks, as the light of information and observation dispelled the mists of greed and unfounded hopes.

These are unpleasant truths and may seem like discouraging ones. Perhaps they really are, and I hope they will so prove to be to the shiftless and purposeless tree planter. The fruit-growing field will be well rid of them and their aboreal abortions. The sooner the *ignis fatuus*, which lured them to a bad beginning, beckons them to fresh fields of useless endeavor, the better it will be those who, unlike them, are not cumberers of the ground.

With all its failures, neglects, and mistakes, the history of fruit-growing in the Northwest, its manifold successes and triumphs, its splendid achievements and unsurpassed displays at State and county fairs, at the great Expositions at Philadelphia, at New Orleans, at Portland, and Tacoma, are fresh in the minds of tens of thousands of men and women. There is no trouble about the soil and climate; and there really is no trouble about the markets. There is always room on top. When it is remembered that the land of big red apples imported carloads of the Ben Davis variety last year, that our fruit dealers are making preparations to raid Arkansas orchards for a supply to meet the demands created by a light yield for this year, a decent, reasonable, honorable State pride ought to set every fruit-grower in the Northwest to pruning his trees and fighting all manner of pests, getting ready for the markets which await good fruits all over this land.

But let no man be deceived and suppose that the Northwest is going to have a walk-over in the great race for equality in the markets of the world, admitting as true even the most that can be said in favor of the soil and climate of this region. The writer on the subject of "Horticulture Gaining Ground," already quoted, says: "Immense developments are going forward on this line, not only in California, Oregon, and Washington, but in Arizona, New Mexico, Texas, and many other States of the farthest West. \* \* Arkansas and Missouri are producing great quantities of the finest apples, while Colorado is rapidly coming to the front in horticultural pursuits." In addition to Australia, South Africa is becoming a competitor in deciduous and citrus fruits of California. But looked at from an intelligent standpoint there is nothing alarming in all this to the energetic, conscientious horticulturist. These things do not narrow, but rather widen the horizon of his outlook.

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There are many cognate branches of this subject, those of transportation, coöperation, etc., which remain to be touched upon, and I may do so in a future article.

But one fact stands out more prominently than all others, and that is that the Northwest fruit-grower may not hold his own, much less conquer new fields and hold them in permanent and profitable occupancy unless he takes "Excelsior" as his motto, and lives up to it, and shows himself and the product of his orchard the equal of the best if not the first among equals; but for the necessity of striving to reach this point which makes itself so disagreeably apparent in Northwest orchard and market I should not have written these articles. One thing is certain, if I have not pointed out the exact location of profitable "Markets for Northwest Fruits," I have at least traced the profile of the only feasible, the only possibly practicable road to them.

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# APPENDIX.

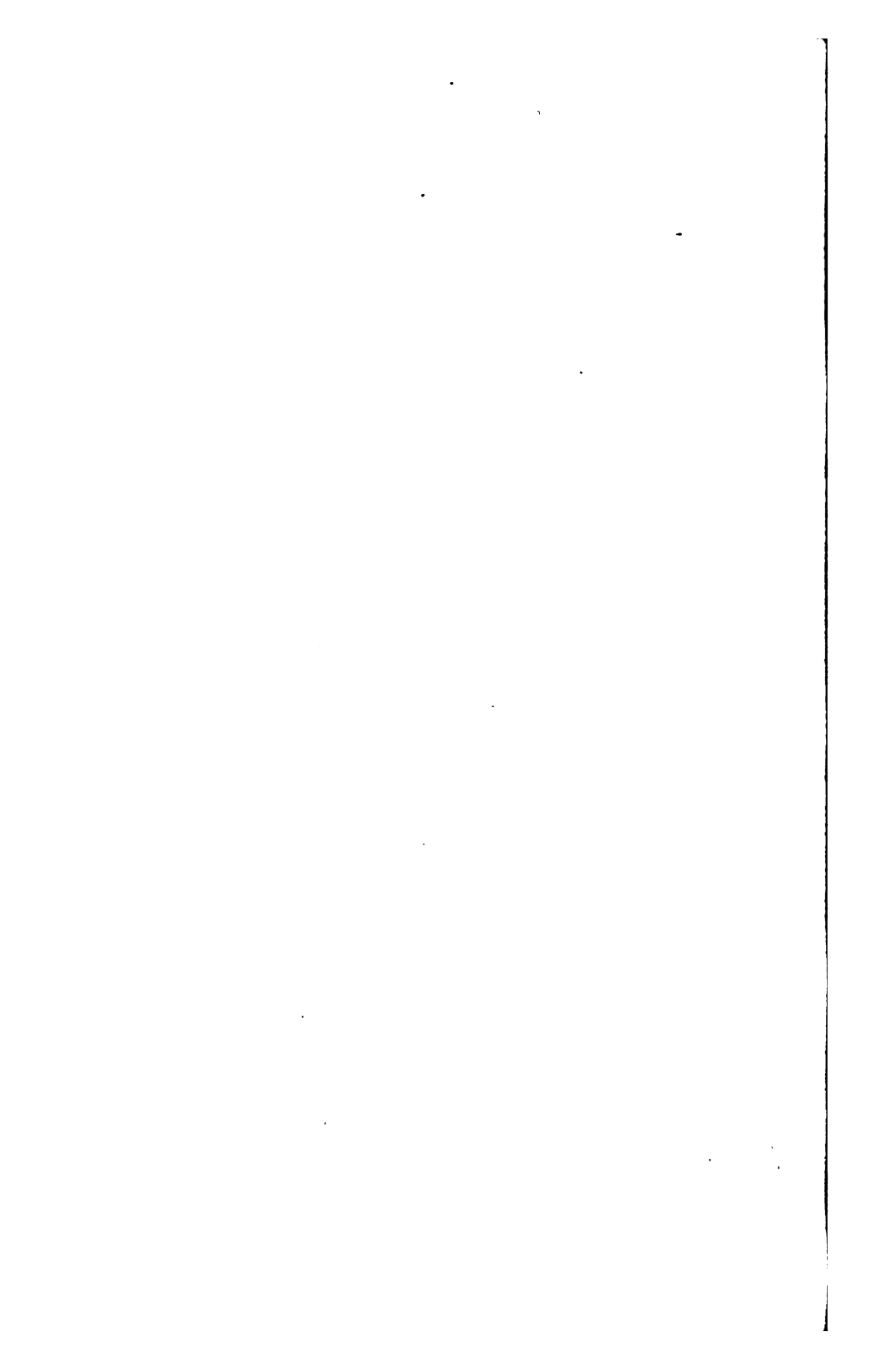
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Containing Proceedings of Fruit-Growers'  
Convention, held at

SALEM, OREGON, APRIL 18 and 19, 1893.

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## PRESIDENT H. W. COTTLE'S ADDRESS.

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In pursuance of a custom among horticultural societies, and by the request of your Committee on Programme, who, unmindful of the fact that there are in our Society older and more able horticulturists, placed me upon the programme, it becomes my duty, as your President, to deliver an address, or rather to present a few thoughts pertaining to the cultivation of fruits, and of such other matters as are of interest to the Society and its members.

The planting and growing of fruit is a grand, noble, elevating employment. In this world we judge of things by comparison. The man who plants wheat, reaps his crop, and ships it with a part of the fertility of his farm. The transaction is ended. The man and his pocket-book are but little, if any, better for it. The farm has lost a part of its fertility. The man who plants and cultivates successfully an orchard plants something that will prove a joy and a pleasure to himself and others while he lives, and also to those that come after him.

A year ago we met with bright anticipations of a bountiful fruit harvest, but which were only partly realized, the fruit being injured by cold late rains at the time the trees were in blossom. Although our crop was light, yet the year was not without its benefit in the lessons learned as to the proper modes and manner of planting, cultivating, and spraying our trees; and also in the further fact that owing to the destruction of a considerable portion of our fruit, our trees rested, as it were, during the year, and today, laden with blossoms, bid fair to give us one of the most bountiful crops ever gathered in this State.

The lessons of the past year, if rightly learned, place us in a position to more successfully suppress the various fungus diseases of our fruit, as well as the injurious insects.

It has been demonstrated beyond a question that the Scab on the apple and pear can be almost entirely suppressed, and a very large proportion of our apples rendered free from the Codlin Moth or Apple Worm; and hence, that fruit can be grown and put upon the markets here that has no superior and few equals.

This, taken in connection with the fact that during the past few years thousands of acres of new orchards have been planted in this

vicinity, should satisfy any one that the Willamette Valley is destined to become the center of the great fruit-growing district of the Pacific Northwest. The magnitude which the fruit industry is assuming is simply astonishing to any one who will take the trouble to investigate. It will be but a short time until thousands and thousands of wagon loads of fruit will be delivered yearly to the markets in Salem, where in the past it has been so insignificant as to be hardly worthy of mention. Fruit-growing is the foundation of the future prosperity of this valley.

In Santa Clara County, California, there are, as shown by the assessment rolls, over 1,400 fruit farms of 10 acres or less. There are about as many more of from 10 to 40 acres. Upon each of these farms there are employed more men than are today employed by the average wheat-grower of this county upon his 160-acre farm. A few years ago that was a wheat-growing district, where land was cheap and the farmers were poor. Today, it is one of the richest and most prosperous districts located upon the Pacific Coast. Fruit-growing has been the cause of this great change. An equal amount of improvement is to be seen there in their homes. The plain, commonplace sort of a house has given way to a beautiful and even elegant dwelling, surrounded by spacious lawns and beautiful flowers.

The fruits grown there which are considered the most profitable are the prune and the cherry. The cherries of this valley are, as you know, second to none; while the prunes, both the Italian and Petite, are superior to those grown in the State of California. This has been proven wherever our prunes have been well cured, properly sorted, and put into competition with the California prune. The reports of the Agricultural Department of this Government show that the largest and best flavored plum grown in the United States is grown in the States of Oregon and Washington. The prune is a plum. What fruit-growing has done for Santa Clara County, California, it will do for Marion County, Oregon. Changing a country from grain-growing to fruit-growing means that from ten to twenty times the number of employes are furnished employment. This means a largely increased prosperity for our merchants, our mechanics, our laborers. This means good times where times were hard before. But, says one, this means over-production and ruin to the grower. You always find men in every community ready to prophesy trouble, disaster, and ruin. As a gentleman said lately, every one must have an occupation, and it does not take much money nor brains to become a grumbler. It is an easy business to get into.

Some ten years ago the amount of fruit and vegetables shipped from the Southern States to the Northern States was so insignificant

as to be deemed unworthy of a place in the census. We find now that over 300,000 carloads are shipped annually to the Northern States. The growers of these fruits and vegetables have not met with disaster, and the market still keeps good, and with this immense amount shipped annually there has been no over-production. A prominent Californian told me last fall that he had been growing prunes for sixteen years, that he had heard talk of over-production all that time, but that the business had been more profitable to him as the years rolled by, and better methods of cultivation, pruning, and grading prevailed. His prunes last year brought him over \$500 per acre.

I do not mean to intimate here that any one can put out an orchard and realize exorbitant profits, for it is a fact that in all business—and fruit-growing is not an exception to the rule—there are failures and that they are numerous. There will be failures in fruit-growing in this county. Not only in the growing, but in the preparation for market as well. All men are not adapted to become fruit-growers. Many men will not properly prepare their ground before planting, will neglect their trees after planting, will prune improperly, neglect to grade and pack their fruit as it should be, and will take their fruit to market in a poor, imperfectly cured, slovenly manner. These men will fail to realize good prices, and will say that there is over-production and nothing in fruit-growing. That is true, *for that class of men*. But for the man who thoroughly underdrains his orchard,—I said awhile ago that fruit-growing is the foundation of the future prosperity of this valley; I now add that underdrainage is the basis of the foundation for future prosperity here,—who plows good and deep and at the right time; who plants good, thrifty, clean, healthy young trees, prunes them properly each year so that the sunlight and air reach his fruit; who cultivates thoroughly, and keeps his ground worked up so fine that it is like a mulch spread over the surface; who examines his trees regularly and thoroughly for Borers and other insects injurious to fruit; who sprays properly; who thins the fruit; who thoroughly grades and cures it in the best manner, packs it evenly and nicely in clean, neat boxes, upon which he has put his name and the name of his orchard,—that man will make a success of fruit-growing; and for such a man there is no danger of over-production and never will be.

To make a success of fruit-growing one must grow only the finest, choicest, and best, which must be put upon the market in a condition to please the eye. With fruit placed upon the market in this manner, by proper coöperation of the fruit-growers, it will become simply a question of supply and not of over-production. The

United States now has a population of sixty-five millions; this is steadily increasing; conservative estimates show that not one tenth of the people of the United States today purchase fruit grown on the Pacific Coast. By coöperation, and with increased shipping facilities, our fruits should be laid down all over the United States at prices that will bring it within the reach of all, and yet will be satisfactorily remunerative to the grower. It has been said that the prune is the poor man's fruit. By cheapening the price to about one half what they have been for the past year, it is estimated that the consumption will be increased many times over, and that even then handsome profits will be realized by the grower. Californians inform me that they can be grown and cured for less than three cents per pound.

The claim has been made that in Oregon it is necessary to evaporate all prunes, and that consequently we could not compete with California, where they are sun dried. To prove that this is a wrong conclusion, you have simply to turn to the market quotations of fruit in the California papers, where you will find evaporated fruit quoted from one to three cents a pound more than sun dried fruit.

In the early days of fruit-growing in this State it seemed to be the rule to plant as many different kinds as possible. The result is that in the older orchards it is almost impossible to obtain a carload of good marketable fruit of any one kind.

Later planting has been more intelligently done and we find beautiful orchards of prunes, also of apples, pears, and the other fruits. But let us not make the mistake of basing our hopes of success entirely upon any one particular kind of fruit. Let us rather plant enough to furnish a carload of this kind and a carload of the other, choosing the kinds that there is the greater demand for and that are adapted to this climate. It will prove safer and be more sure to yield steady profits than to go to extremes in basing our hopes upon any one kind of fruit.

Many of our fruit-growers have become satisfied that by choosing the proper locations, peaches can be grown as successfully and of as fine flavor in this valley as in many of the noted peach districts in the Eastern States.

The cherry is not being planted as I believe its merits and the market justifies. Our cherries are unequalled. Insect pests which are so troublesome in the East are unknown to them here; and this fruit possesses the advantage of being a good fruit to sell green, to can, or to dry. Last year cherries were laid down in the city of New York from the Pacific Coast in seven days in as fine a condition as when taken from the orchard. They were shipped in refrigerator cars. So that we really have the markets of the entire United States open to us for fresh fruit.



Apples have been shipped from this State for several years across the ocean to England. It seems to me that the planting of the proper kinds of apples has not been carried to the extent that other fruits have been planted, and to the extent that is justified by reason of its keeping and shipping qualities.

Grape-growing is in its infancy here, but is commencing to look up. Smaller fruits have proved remunerative where intelligent and thorough care has been given them. Raspberries and blackberries should be planted more extensively, and when the local markets are supplied, the balance should be dried. This can be done quite extensively and profitably. There are fruits that have been considered too tender for this climate, that by proper trial may prove to be well adapted to cultivation in this valley.

When I left the old farm in Illinois to settle in Northwestern Iowa I was told that corn could not be grown in that country, that it was too cold, and would be killed by the frost. However, I took a sack of seed corn along with me, choosing the earliest, most hardy kind, then known as Calico corn, and planted it. The result was surprising. I raised a bountiful crop. That country is today one of the best corn-growing districts in the United States, although the opinion prevailed when it was first settled that corn could not be successfully grown there. Careful trials may convince us that this is true of many kinds of fruit here.

I now desire to make a few suggestions to the Society which they can take for what they consider them worth.

We have all been building more or less fences upon our farms, for what? It must be either to keep somebody's cattle out or to keep the farm in. Why should we fence for other people's stock? The farm won't get away even if there is no fence around it. In Illinois we dispensed with fences. The same plan was adopted in Iowa. The only fences we had there were around our pastures, and these were good ones. This saved a vast amount to the farmers and proved highly satisfactory. I believe it would do so here. I would suggest that you have committee appointed upon this subject to thoroughly investigate the same and report at your next meeting.

While political parties may differ as to the benefits of protection, I believe that the fruit growers are unitedly in favor of it *for themselves*. This State should have laws that furnish adequate and needed protection to our fruit growers. Such laws were submitted to the State Horticultural Society and to the State Board of Horticulture. After a careful examination they each unanimously favored their adoption and the legislature was asked to pass them. They prohibited the importation of trees from the infected districts of

the East into this State. They also gave the State Board power to compel the pest-breeding and pest-infected orchards to be cleaned up. This was killed upon the flimsy pretext of a few attorneys that it gave to this Board the right to invade and destroy private property.

If my horse becomes infected with the glanders, under the present law, the Stock Inspector has the right to come on to my premises and cause that horse to be killed. No one thinks of changing that law. No one would want it changed so that a complaint had to be made against me, attorneys hired, and a trial had before that horse could be destroyed. That horse is dangerous to the community. It is but right and just that it should be destroyed upon examination by proper authority.

There is no worse nuisance in the State, not even glandered horses, than these pest-breeding and pest-infected orchards. They are working all the time, and the damage done to this State by them amounts to hundreds of thousands of dollars, but under the law proposed it was not necessary for the orchard to be destroyed. The owner was simply required to clean it up and free it from these pests. This failed to become a law. Members elected by our votes helped to kill it.

At the same time, however, the legislature voted an appropriation of one hundred thousand dollars for a National Guard. One hundred thousand dollars additional amount of taxes to be wrung from the already over-burdened taxpayers of this State. The farmers, the fruit-growers, the home-owners, the taxpayers of this State had asked for no guard to protect them. They wanted no militia or standing army maintained at their expense, and yet every one of them has to assist in paying this hundred thousand dollars. National guards and militia, standing armies, are not needed in lands of free common schools. The proud boast of our citizens should be that every man within the borders of his country is a soldier and the peer of any of the trained soldiers of Europe or America. This has been fully proven on many a hard fought field.

Fellow fruit-growers, you have a duty to perform, and that is to select a committee on legislation that will see that our interests are properly protected and that the money of this State is not squandered. It is true that the legislature does not meet for some two years. I call your attention to these matters in order that they may be intelligently discussed and considered, and a thorough organization had before the legislature meets so that matters of interest to us can be properly presented to that body, and presented in such a manner as will command respect and attention and not be ignored by men placed there by our votes.

The laws governing assessment of property should be so amended that in assessing property the number of trees of each kind upon a man's farm will be taken down, in order that there can be reliable information obtained as to the number of trees and probable amount of fruit raised within this State. In Canada, and a number of the States of this Union, a primary work upon agriculture is taught in the common schools. I can conceive of nothing more beneficial than to have a primary work upon agriculture and horticulture taught in the common schools of this State. I think that a certain amount of time is taken up in our schools with matters of far less benefit to the students and the future of the community. This work should be gotten up by the most prominent agriculturists and horticulturists of the State, the manuscript submitted to able and thorough followers of each of these vocations, corrected up until it is in the most simple, correct, and perfect form. I think this matter is well worthy of your attention.

There should also be appointed, it seems to me, a committee upon roads. There is strength in organization. If this Society, the Grange, and other societies take hold of this matter we will see results. It is apparent to all that they are needed.

I would suggest that a question box be established. In all organizations there are parties who do not like to get up in public and ask questions, that would write out the question and hand it in, which would bring the matter before us for discussion.

I thank you kindly for your patient attention in listening to these rambling and somewhat disconnected remarks.

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## DISCUSSION.

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*Mr. F. J. Beatty:* In our President's address, he spoke about the over-production of fruit. I desire to mention one thing he perhaps forgot or overlooked,—that was, the price of fruit down in California. Eleven or twelve years ago prunes sold there at one cent a pound, and I am told that last fall and for several years past, although they multiplied by thousands of thousands, and yet the common price for the same fruit now is two and one half cents a pound. Over-production there has not ruined it.

*Mr. J. E. Shepard:* Now what I do believe is that there is nothing that the American citizen cannot overdo. I do not believe there is anything that we cannot overdo that we turn our attention to. We are finding that every commodity is in danger of being overdone. I don't know that there is an exception to this. We

must use some intelligence. I believe that the present inhabitants of two such countries as this, that prunes can be supplied with from the Pacific Coast. All we need is the contract. It is simply prodigious, and yet we have a population in the United States to supply of sixty-five millions. Sixty-five millions, and I doubt if one tenth of the people of the United States have ever heard of a Pacific Coast prune. The point is this: We have simply got to economize in the production of dried prunes; economize at every outlet, until we can reduce the price, and by reducing the price the consumption will be increased at an inverse ratio. Prunes have been this season much too high for the ordinary common people to consume, and as a result, although the production last year was very small, prunes this year are cheaper than they were just after the harvest last year. Prunes have fallen when they should by every known rule and precedent have increased in price, because they started in too high. Ten cents per pound is too high. When we get them down to three, four, or five cents, we will not be able to produce enough, I believe.

*Mr. Jory:* I can fully endorse almost every point that the President has brought forward. I think it should be obligatory on persons who have infected orchards to clean them up, and until this is done it is but little use for Mr. Cottle, or Mr. Shepard, or some other persons, whose farms are surrounded by these, to clean up their trees, for they soon get infected with these. Now he spoke of the proper mode of pruning trees, to let sunlight in and produce the most fruit, etc. I believe that although most of you understand why we prune, what the object is, I believe that it is too much neglected, and we don't give sufficient time and attention to what we are pruning for, as we ought to. I believe in pruning that there are two systems; one is to thin out the limbs; you can prune to thin or you can prune to thicken the top. Now, then, as a matter of course, different varieties require different methods of treatment. For instance, if you wish to prune a tree so as to give a thick top, all you have got to do is to thin out the shoots of the last year's growth and you can soon get a very good top. On the other hand, if you wish to trim so that the sunlight can get through, you have got to cut the limb right off at the trunk or at the large limb where the limbs shoot out. In regard to summer pruning, some people are in favor of pruning at any time that you happen to have a knife with you. I don't believe that you ought to prune—while you might take off a stray shoot—any time in the summer. Don't begin to prune when the tree is in vigorous growth; if you do, you injure the tree. In regard to the over-production of prunes, I don't think there is very much danger of our

over-producing until we can supply them at a much lower rate than we have ever done before in this valley yet. I believe that we can supply a good article or prunes at four or five cents and make a very good profit by it, and if we can do so there would be a great deal of demand for them on account of the cheapness, more than what there is. They are entirely not within the reach of ordinary persons at present, and not likely to be for some years to come; although we may raise all the prunes that we can, it will be quite awhile, I think, before there is any danger of over-production. In regard to his remarks for marketing, I think that they are very pertinent, with the exception that I don't think he laid stress enough on the great necessity of union or combination with the growers not to ship as individuals, but to have our fruit go in such a manner that we can have the benefit of this Society for to market our fruit. I believe that more could be done in that way and ought to be done for the benefit of the growers in regard to marketing than has been done at any time.

*Mr. William Wright:* In regard to over-production, I would like to recite a little of my experience. When I was in Illinois in the fruit-growing business there, we had twenty acres of one kind of strawberries, one kind alone. The cry went up, over-production. We found that the trouble was we hadn't got near enough; and we found that by throwing away one half of the inferior kinds and selling it at the home markets, our best we sent off to large cities, and we got as high as a dollar a gallon.

*Mr. Beatty:* In Oregon we don't have to prune for fruit. Here we have too much of it. We have to prune here in the winter time so that it doesn't produce so much. Fruit trees in this country overload themselves and kill themselves by bearing too much, and we have to prune so that they will bear less. It is not like it was in the Eastern States where we had to do our best to get a little fruit off of the tree; and for that reason all of the fruit-growers in this valley and on this coast, we are all nearly unanimous, that the time to prune is in the winter.

*Mr. Shepard:* I would like to ask the President how are we to pack our fruits, our dried prunes, this coming season.

*Mr. President:* The custom in California is to put up their large fine prunes in 25 or 50-pound boxes, and their other prunes in sacks.

*Mr. Long, of Silvertown:* It is well enough to take off a sprout on the tree, but for summer pruning altogether I am terribly opposed to it. I was up in Linn County this winter, and there was a man who did some summer pruning on his two-year-old apple trees. Some old gentleman advised him to summer prune when the trees

were in bloom, or even after; and the consequence was that he cut the trees back,—the young two-year-old trees,—cut them back and cut out the buds, and the fruit spurs—what we call fruit spurs or laterals—he allowed those to grow; and the consequence was that the tree was just a sort of brush. He wanted me to show him what to do with it. I couldn't advise him what to do with it after the tree had got in that fix; but on old trees, if you want to prune for fruit, if the tree is not bearing the amount of fruit,—but on a young tree never do any pruning in summer, except a little water-sprout that is liable to make the tree grow up too thick in after years. The practical fruit-growers of this State and Washington do their pruning in the winter time, in February or March. A. H. Carson of Grants Pass, J. H. Fletcher of Vancouver, and the Shaw Brothers of Vancouver, and all those successful prune-growers and fruit-growers do their pruning in February and March.

*Mr. E. P. Beazley:* With regard to fruit-growing and pruning, I will say that I have been in the fruit business more or less for 30 years; that winter pruning is promotive of the growth of wood and summer pruning when we want to retard the growth of the trees, is the rule. I understand that the foliage performs to the tree the function of lungs to the animal; and if you want to check its growth, if it is making wood too fast, do a little summer pruning when the foliage is out; but if it is making wood too fast so that it will not produce fruit, then prune it in the spring, just as near the time the sap starts as you can get. The sooner the tree heals over the better. That is one thing we are managing for when pruning, is to keep the tree in a perfectly healthy condition. Then if we prune in the fore part of the winter the tree will receive damage from the wound; but if we prune in the spring, then the tree will heal in a very short time. If we want to promote the growth of the tree, prune in the winter time; but if we want to resort to wood pruning, prune in the summer time. It is my understanding that the trees depend upon the sunlight and air, and consequently they need to be pruned out so that the sun can shine through them; and then when they set on too much fruit, as the gentlemen says, thin out the fruit. It is my impression that we will not over-produce any fruit in this generation; that is, for the next 25 years there is no danger of over-production of good fruit. We want to keep our trees in a vigorous condition. Then I want to say something in regard to the tillage of soil. We can't plow deep without injuring the trees. We want to keep them in vigorous and healthy condition.

*Mr. D. D. Keeler:* I have handled a good many prunes for the Indian reservation, and always found the boxes preferable. They

came in much better shape and retained their shape. They were much freer from worms and everything of that kind, and I think that boxes, nice, clean boxes, and prunes put up in them will find a market much more easily than those put up in bags.

*A fruit-grower from Polk County:* I have several thousand trees, different ages, some of which are well advanced. The first that I put out I cultivated highly for two or three years, after which they were neglected, but they have borne regularly until last year; but my younger trees—those that are just coming into bearing—are, I suppose, rather fine; said to be by nearly everybody who passes my place. I have pruned more in the winter time than earlier or later, and I prefer to do so. What little I know about raising fruit I have learned by experience principally, though of course I read the agricultural papers. I have been in the habit of cultivating my young orchards in fruit two not to exceed three years in crops.

#### SECOND DAY.

President H. W. Cottle called the meeting to order at 10:15.

On motion, subject of Spraying was taken up.

*Mr. Beatty:* If a tree—apple trees for instance—have the eggs of any kind of insects on them, it would pay to spray them; but as far as prune and peaches are concerned, I think it would be a waste of time; but as for the apple trees which are covered with the Green Aphis or Woolly Aphis, it would pay to spray them, but they can be easily seen all over the limbs of the tree.

*Mr. McAtee:* I think the best thing is to spray them. It is very hard to tell whether a tree is infected with any of the parasites, and if you spray it and it has nothing, it don't do any harm; but a great many people in talking about spraying don't know what they are spraying for. They are spraying with fungicides and spraying with insecticides, one to kill the fungi and one to kill the insects. Now some of the sprays that we have ought to be used on trees before the buds come out; especially the Bordeaux Mixture No. 1 is generally to be used before the buds come out. The Bordeaux Mixture No. 2 is to be used after they come out. These are to kill the fungus parasites of the tree, and insecticides are more poisonous. Some of these insects have a bill to suck the sap of the foliage of the trees, and for these you have to have something like concentrated lye or tobacco. A great many don't know how to use them. There are men here in this valley who have burned and injured some of their trees with sprays. So I think the members ought to be very careful in recommending this kind of spray and that kind of spray, for a great many would not think that London purple or Paris green would hurt the foliage of trees. They have to be very

careful. It will soon be time to spray trees, and the best time to spray fruit trees is after the blossom has fallen and when the fruit is about the size of a pea; and in using any of those sprays you have to be very careful what you use, especially on the peach; it is one of the tenderest of things.

*Mr. Shepard:* I think we would all be pleased to hear our President on Spraying. I believe he has had some practical experience, especially with the Bordeaux Mixtures.

*Mr. President:* I would add to Mr. McAtee's statement that there are two kinds of insects. Paris green sprayed upon your trees would have no effect upon some of them. They have no jaws. They don't eat. You could place your Paris green over the leaf and it wouldn't hurt them. There are various preparations that will kill this kind, such as whale oil soap, lye, tobacco, etc. I find that these are generally recommended. Instead of waiting, as Mr. McAtee says, it is generally recommended to do the most of the spraying during the winter before the leaves come out, as stronger sprays can be used at that time. However, my own experience in using these stronger sprays before the leaves come out is that they have no effect that I could distinguish at all on the eggs of the Green Aphis. I find them hatching in my orchard by thousands—millions even—and yet they have been sprayed with mixture of one pound of lye made so strong with rosin that it was sticky, thinking to make it effective. There is a red mite here in our orchards that has a little bright red egg, vermilion color; looking at it with the eye it looks like a sort of red fungus. With the glass it looks like a bright red egg. I sent samples of this to Professor Washburn, of the Agricultural College, and to Professor Riley, of Washington. Professor Washburn replied that they were what was known as the red spider, and that they could be destroyed by means of washes, such as lye, or whale oil soap. Professor Riley wrote back that on his first examination of this some years ago he had pronounced them the red spider, but since then he had gone into a very exhaustive examination, and they had decided that they were what is known as the Red Clover Mite, the eggs being red and the insect being red, and that it is almost impossible to do anything with the eggs, but when they hatch they are easily killed with the whale oil soap. They are injurious, but not so much so as the Green Aphis. They eat the leaves. He states that they are apt to get into the house; and they also eat clover and grass. They are not as bad as many of the insects, and they are easily destroyed by these remedies. In regard to spraying with Bordeaux Mixture, I find that the general opinion among horticultural experiment stations in the East and in Ontario is that



90% of our fruit can be saved from Scab, the apple and pear, and the mildew from the grape by spraying with the Bordeaux Mixture. This Bordeaux Mixture is made in several different ways. What was known as the standard Bordeaux Mixture, the one in common use, was to mix six pounds of sulphate of copper or blue vitriol, and four to six pounds of lime in 22 gallons of water. They were mixed up separately and then mixed together; that being the total mixture. There were one or two parties that recommended using a considerably stronger mixture than that before the foliage came out, and in the State report of this State it was reported that I had used this stronger preparation; but I had never heard of it until it was published in the report. I informed the Inspector of this district that I had used the Bordeaux Mixture in common use, meaning of course this six-pound preparation, but it seems that he had read of this other and published it in that way. I don't know that it would do any particular harm, but it would be very expensive; and it has been demonstrated by the Canadian Department, and by this Government, and by experiment stations in Ohio and other places, that much weaker mixtures can be used before the foliage comes out to destroy the spores of these fungi; and a preparation has been recommended by prominent horticulturists in the East as weak as one pound of the blue vitriol in 100 gallons of water. First, you clean up all rubbish in the orchard that there may be in there, and then you spray the entire surface and grounds with the Mixture. The preparation now in common use—and it has proved to be just as effective in common use as this Bordeaux Mixture—is known as the Dilute Mixture, and is made by dissolving three pounds of sulphate of copper and three pounds of lime in 22 gallons of water. Professor Pantou, of the Guelph Experiment Station, of Ontario, and the Ohio Experiment Station used the same and found it just as effective as the full strength Mixture. Four pounds of sulphate of copper and four pounds of lime in 50 gallons of water is the preparation that I am using this year. It is generally recommended by these experiment stations to use this before the leaves come out, before the foliage starts, so as to destroy the spores of these fungi, which are much more easily destroyed at that time than later; and this preparation they had tried and found as effective as any stronger preparation. I don't know that there is anything in particular that I can add to this. It was stated in our meeting last winter that the Winter Nellis pear was unworthy of a place in our orchards. I had read in these reports that the Scab could be suppressed at least, if not eradicated. Last year I tried it with splendid success. I took to the State Horticultural Society in Portland, Winter Nellis pears, large, fine, and

clean. There was somewhere from 80% to 90% of my pears that had no Scab on them. There are a great many thorough and practical horticulturists in the East who state that they would use this Dilute Mixture even if there were no Scab. They would use it upon the pears and apples for the reason that it makes the foliage much better and more vigorous, and prevents the leaves and fruit from falling from the tree. There are certain kinds of fruit, especially in the East, which are troubled with the leaves falling off; and the report has been invariably that where they have used this, the leaves and fruit have both remained upon the tree. Now, the Italian prune in this country is subject to falling off from the tree. It is stated that there are too many upon the tree, and that it simply sheds off those which can't mature. We find that other trees are loaded as well, that don't fall off, like the Petite prune. I am trying Dilute Bordeaux Mixture this year upon the Italian prunes. I have sprayed them once, and shall spray them again, and another winter will be able to report the result. Now, this blue vitriol is in common use among our foremost agriculturists for smut in the wheat and oats, and they have realized much benefit. There are diseases of the peach that are fungus diseases which they are preventing, and this Peach Rot that has been alluded to. This Peach Rot has been prevented readily by spraying. I do not know that this is a fungus growth. The Mildew upon the grape is a fungus growth, and this Bordeaux Mixture is used for it. Now, I find that the report is almost invariable that the curled leaf upon the peach is a fungus growth. It is caused by climate,—by cold, wet weather. Every disease must start from something; but it is claimed to be a fungus growth, and there are hopes by spraying with the Bordeaux preparations to suppress it. I am trying it upon a number of peach trees this year, but I am making it much weaker, as the peach tree is very tender. If this will prevent or suppress the fungus growth in these other things, I don't see why it won't in the peach. Of course, we may have to learn when to use it and how to use it; but if we can get any benefit from it, it will be of great value to us.

*Mr. McAtee:* I stand corrected. I did not mean to say that we had used Paris green for all insects; but I was saying that the Society ought to know what they were spraying for. There were different kinds of spray that were all used. There were some of the members who thought one spray was just as good as another. As for the Paris green, they begin to spray with that when the apples were about the size of a pea. I referred to that more than anything else, and of course different sprays for different kinds of insects and fungi; but I am not as good a speaker as Mr. Cottle, and couldn't explain myself as well.

*Mr. Shepard:* It has come under my observation that one pound of common soda and one pound bar of common soap in 16 gallons of water is about the best thing for the Green Aphis. I use it when I find the Aphis on the leaf, not on the egg.

*Mr. President:* I will add that the Paris green is a poison. You can't poison the Green Aphis.

*Mr. Beatty:* The Green Aphis is not actually dangerous to the life of the tree. They won't destroy the tree entirely, because it don't furnish them enough sap; and I contend that it will pay a man very well to use sprays to kill off those Green Aphis, not because they will kill the trees, but they do materially damage them; and I have a mixture that will destroy the Green Aphis. Whale oil soap and concentrated lye and muriatic acid in the spring; and in the summer time I use a solution of whale oil soap with tobacco. That will actually kill them, and you can use a solution of tobacco and whale oil soap with this Paris green and lime solution, and it makes it still better, and it will kill two birds with one stone, as the saying is, and it is very cheap; and I believe that in using this whale oil soap and alkalis that a person gets the full benefit of his trouble in the added fertility of his trees. It is a fertilizer, and it is what every one should use, whether it kills bugs or not. It vitalizes the trees and makes them pay enough for the trouble and labor. Soap is one of the best fertilizers for fruit trees that there is. All of this that you put on the trees is not wasted; it goes down into the soil and helps the trees. Your labor is not thrown away; neither is the expense. The Green Aphis does not kill the trees, but they materially injure them.

*A member:* I would like to ask Mr. Beatty, when he destroys the insects during the winter, whether he finds insects on the trees in the summer?

*Mr. Beatty:* Why, they will come in from other places. The woods are full of Green Aphis now. They are abroad in all parts. They will come back again. But if you kill the eggs in the winter time, they are all ready when the buds open to suck into the apple leaves. Every particle of sap instead of being used in the nurture of the tree is sucked up by these Green Aphis, but if you spray in the winter they are not all ready to hatch when the apple forms, and it gets a start.

*A member:* Don't you find that the Green Aphis has an enemy that destroys it?

*Mr. Beatty:* Yes, sir; all living things have enemies. It is the tendency of nature to balance all things, but at the same time we can't afford to wait for this balance of nature to come around. We have to fight those pests ourselves, and we can do it more effectively

than the natural enemies. Myself and a man can go over my 10-acre orchard in a day's time.

*Mr. E. Hoffer:* Does Green Aphis attack the peach, prune, or cherry?

*Several members:* No; these fruits are almost free from any insect or disease.

*Mr. President:* The peach has a Peach Aphis or Louse.

*Mr. President:* In regard to cutting off the ends of the twigs to kill these Green Aphis, we must remember that these Aphis hatch every few days, and we would only kill a part of them. Now, he must either spray to keep them off, or he must have the assistance of the lady bird. There is no question about this. In my orchard south of the city I took Inspector-General Varney out to see it. There was a great many Lady-birds. I went out to spray my orchard north and I found that the Lady-birds had almost entirely exterminated them. So we must take them into consideration. In regard to Mr. Hofer's fear that newcomers may think we are left to insects, I desire to say that there is not a country in the United States but what is subjected to these insects more than we are here. The Aphis is as bad here, but the Curculio is unknown. In regard to an exterminator for the Borer, I do not believe it is possible. You may temporarily prevent them from getting in, but if the Borer has gone in and worked in two or three inches, I don't believe there is any preparation that will kill that Borer except to take a knife and dig it out. I find that the rule of the most successful horticulturists is to go through twice a year and dig them out of the tree—those that were there. In October you go through and you take the earth away very carefully, and you will find many from one fourth to one third of an inch just outside the tree. I find great trouble in getting the man to examine carefully for them. In Mr. Wallace's orchard the opinion prevailed that there were no Borers in that peach orchard; it was in sandy ground and they couldn't get in it. I understand that since that time they have found them. In regard to the Aphis injuring apple trees, there is no insect that you can put on there that is a vegetarian but what will injure the tree. I have seen the damage right in my orchard. The leaves of the tree are the lungs of the tree, and you might as well suppress the lungs of a child and expect it to live. But they may go away,—that is, the Lady-birds may eat them up,—but if you haven't got a sufficient number of Lady-birds you must destroy them. The spraying machine is today recognized as just as great a necessity in every orchard as the plow or the cultivator. The statement was made in regard to Paris green burning the foliage. If you mix up your Paris green, one pound to 200 to 300 gallons of water, and put lime in, it will not

injure the foliage; but the Paris green, if used alone, is liable to, because it varies in strength. Now, in spraying with this Bordeaux Mixture, it costs comparatively nothing. With this weakened solution you spray once before the foliage comes out, but after your blossom has come out and your fruit nearly the size of a pea, and mix Paris green with your Bordeaux Mixture. Mix your Bordeaux Mixture, say four pounds of sulphate of copper and four pounds of lime in 50 gallons of water. In 200 pounds of this mix one pound of Paris green, so that the same time you are spraying for the Green Aphis you are spraying for the Codlin Moth.

*Mr. President:* Discussion will now close on this subject, and we will listen to an address by Hon. J. M. Wallace.

*Mr. Wallace:* I think it is rather presumptuous myself to say anything to the Society. I have no experience in raising fruit, and I have listened to the discussions this forenoon with a great deal of interest. I have been looking into the matter of shipping our green fruit; as I hope, unless the insects eat it all up, that we will have considerable fruit to ship. My experience has been mostly in the shipping line, and I have looked into the matter with considerable interest. Last fall I was East and I spent considerable time looking over the situation and getting posted. I visited Denver and also Chicago; had correspondence also with Minneapolis. In Denver I conferred with men on green fruit, and the universal verdict was that Oregon fruit came in in poor condition and did not bring full price. I naturally tried to find out the cause. By special inquiries I found that our fruit that has been used has *lacked uniformity of packages* and manner of putting up. There was *not care enough* in putting the fruit up, having it properly packed, and somehow it did not get there in good condition. I suspect very much, and I have some reason for it, that considerable of our fruit is not sold there as Oregon fruit. It is sold as fruit from other points. As you are aware, there has been comparatively little fruit shipped from the valley which has gone from first hands, and this matter should receive our careful consideration. We know in the first place there is no use in our shipping fruit unless it is of the very best quality, and then if you get it through in time you are almost certain to realize a good price. Unless you do, however, you had better not ship it. One important feature in shipping green fruit is the speed of getting it into market. On special inquiry at the markets I found this, that fruit is shipped from Portland by special rates to Green River, and at that point it connects with the California fruit and goes into Chicago with that. The objection I have to that is this, it makes the time of delivery in Chicago rather uncertain; it depends on the regularity of the California shipments. If

they are not shipping every day, if they don't have a train every day, it may be a week our car lies there at a great disadvantage. I think that we could by some way secure rapid transit right to the point of distribution, and see that it goes through and is sold as Oregon fruit. In reference to the rates, I think that is another point that should be attended to. The rates have not been set yet; this is important. The committee that takes this into consideration does not meet until next month. After the committee has met and the rates been set, it is very hard to have them changed. The time to lay it before them is before they are set. In reference to green fruit I think we should make a special effort to have it in the hands of persons who will represent it as Oregon fruit and take an interest in it. I may say in reference to canned goods I have quite a little experience. As you all know, I have been connected with the cannery and the question was to try to make it pay. I found in putting up canned goods, fruits and vegetables, that we had to confine ourselves almost exclusively to the coast trade. Now this will not do, because we raise too much. You have the salmon interest. They are put up in the same sized boxes, and they can put the same amount in a car and they can handle them just as cheaply, and the value of the salmon don't vary so much, but still they have been getting a 75-cent rate to Chicago, Denver, Omaha, and so on, while the canned goods have been a dollar. What the future rate will be this summer I can't tell, but I think it pretty certain that the salmon freight and the canned goods freight will be about the same. There is another thing in reference to our markets for fruit that we can. We must manage it so as to reach the markets which consume it; in other words, you don't wish your goods to go through two or three different hands before it is sold to the parties who are the consumers. For instance, you take Colorado. That is a large canned goods State. It takes more canned goods than any other State in the Union, because the miners and the ranchmen don't raise fresh fruit of any kind. Take Leadville; now you cannot ship a car of cherries, a car of peas, a car of pears, because there is no one who wants to handle that large amount. But the way it has been done, you sell to the wholesale merchants in Omaha or Denver, and they divide them, sending a carload to Leadville, and they send them so many peas, so many cherries, and get a big profit in that way. Now we should so manage that it will reach these consumers without losing this profit that is made in this way by these wholesale men. Now in order to do this, we have got to do just as canneries in California do. They have their salesmen out. They sell them delivered so and so. They make up carloads of different kinds. If you sell a carload to Denver, for

instance, you can ship from here to Leadville just as cheap as you can get to Denver, because the road makes the same rates. Well now, if you ship to Denver and they ship to Leadville, they have got to ship at local rates. They have to cost more to the Leadville people. All of these things require careful and united attention if we are going to make a success. This matter of shipping, I think, is a very important one, and should receive careful attention from our part. All of these things should be so arranged as to give us the very best service and the very best results.

*Mr. President:* Gentlemen, this is a very important matter. Fruit was shipped green from California to New York last year laid down in as perfect condition as when it left the orchard, in refrigerator cars. It seems to me that this Society should take some steps to endeavor to get refrigerator cars shipped from this point and to cooperate with the State Board and use our influence to get the State Board to take hold of this matter.

*Mr. Wallace:* As a sample of how things are done. Year before last we put up 2,000 cases of strawberries, last year we put up 1,300 cases; every can of that was sold in California unlabelled. It was sold in the East as California goods.

*Mr. Shepard:* Some years ago there was quite an industry beginning to spring up in this section in the shipping of apples and pears green. The Codlin Moth came along and spoiled all that. Mr. Farrar shipped quite a number of carloads for two or three years. A little later than that I began and shipped several carloads into Colorado, pears and apples, and into Montana, Eastern Washington, and the Sound. Now I don't think that any shipment I have made was sold for other than Oregon fruit. The truth is that Oregon has never been "in it" in any degree with California. With reference to the Oregon fruit arriving in poor condition, I think it is due to the fact that our shippers in Portland re-pack. Fruit is sent to them from all sections in all conditions. There it is re-packed and shipped. There is quite a delay before the fruit leaves. The reason my shipments arrived in good condition was I shipped from the orchard, and the cars did not remain in Portland perhaps a week to be re-packed by Chinamen.

*Mr. President:* This emphasizes the great necessity of spraying. This fact I wish to urge upon every fruit-grower here, try spraying, try it thoroughly. Try this Bordeaux Mixture and Paris green combined together in the proportions that I have named, and commence just as soon as your fruit is the size of a pea or a little sooner. There is one gentleman here who told me that he had sprayed his fruit nine times with the Paris green, commencing *after* the fruit was the size of a walnut and the Codlin Moth was all in it and *he*

*wasn't.* Commence in time. Now this is highly important. There is no question in my mind based upon the reading, study, and observation I have had, but what you can keep your apples and pears comparatively free from Scab and Codlin Moth worm. In shipping fruit I would also urge the necessity of grading your fruit of every kind. They have graders which do not cost much and you can grade anything from a gooseberry to an apple. It is very important that you have your fruit graded.

*Squire Farrar:* Don't let the impression get out here that you can use a mechanical grader to grade apples and plums and pears. Those graders are only applicable to fruit which you would dry. You want to handle it from the time you get it into the box and the box fastened into the car, so that it will not be moved and can't be moved until the man gets into the car and takes the slats off that are holding it down. You can't haul it in a lumber cart, nor can you put it into a grader and let it roll down. That is death to it and death to the man who buys it.

*Mr. President:* I don't know how graders apply to pears, but it is the custom of the California fruit-growers to grade all their peaches, and they don't fall upon each other, but roll along gradually. They put all their peaches, so they tell me down there, the practical and successful fruit-growers, through a grader; but with pears I don't know how it would work.

*Mr. Beatty:* There is one point in regard to disposing of surplus fruit in Oregon that every one must look out for, and that is to be prepared to take care of it yourself at home. Have your driers ready. All this fruit can be put up in such a shape that it will keep for a year or years, and if each one prepares himself to take care of it himself he is almost independent of the local market or the green fruit market. That is the only outlet I can see to be anything like independent is to be prepared to take care of it in that shape.

*Mr. Shepard:* There is an opening for a half dozen enterprising men who are not in business, perhaps new comers, to form a little company among themselves and lease orchards. There are orchards of from five to twenty acres which could be leased at from \$3 to \$20 per acre; and they could take hold of those with an outfit, a spraying outfit, cultivating outfit, lease these orchards for five or six years, and by that time the young orchards will be in bearing. They can lease sufficient orchards to make a circuit every two years, or as often as necessary, to put up from 500 to 2,000 barrels of apples and pears for shipment this fall. Now, I say that if there are two or three or four men who can take hold of it and do the work themselves, I can put any one who is looking for an



opening, who is enterprising, I believe I can put them in the way of a very good thing.

*Professor Smith:* In regard to the putting on to the market anything more than the first grade of fruit, I notice from Mr. Shepard's remarks he would place on the market only fruits of the first grade, let the others hunt their own market. Isn't it just as easy to sell a second or third grade if you mark it as such?

*Mr. Shepard:* Every fruit-grower in California grades his fruit; say 40 to 50, 50 to 60, 60 to 70, 70 to 80, 80 to 90, 90 to 100, 100 to 120. We would have very few over 60 to 70, that is, 60 to 70 prunes to the pound after being dried. I would let the association mark every grade, if it was the tenth grade,—there is not that many grades though,—each grade, however, should be first-class of its grade. If the committee comes to my place and they find my fruit has not been graded, that condemns it; if I have burned it, that condemns it; if there is too much moisture, that condemns it; but my different grades are all marked by the association. It depends on you and I to cure our fruits; and if we don't cure in accordance with the association instructions,—make good fruit,—we don't market through the association.

*Mr. President:* According to the estimate of Mr. Shepard, there will be from 20,000 to 25,000 carloads to ship annually in this valley. It is very important that we be able to handle it right. The *California Fruit Grower* says that "The time has passed when the isolated individual may achieve a success worthy the efforts by the old methods of competing against his neighbor. Associated method is the only logical and business-like method of conducting the preparation and marketing of fruit on a large scale." This paper also gives the result of the Campbell Fruit Growers' Association. They grade their prunes 40 to 50 (that is, after they are dried that number to the pound), 50 to 60, 60 to 70, 70 to 80, 100 to 120. The last named prunes brought them eight cents a pound net to the grower, and the former brought twelve cents a pound. The net average price of the six grades, leaving out the first grade, of which there were but few in California but here there would be a great many, was \$84 per green ton, over four cents a pound. The isolated grower didn't realize over about half of that.

*Mr. Beatty:* I believe that this is something that we will have to come to and very shortly if we conclude to make anything in raising prunes. We will have to combine in some such form as that to market. Now I have no doubt in regard to the result of this organization, the Campbell organization, that the increase of almost 100% in the price of the fruit was the direct result of this organization, and that it gave the buyer confidence of getting a

certain grade, and that is necessary; and if the buyers are not confident in getting just what they buy, they will discount enough to make this good. There is no doubt of that, and by thorough organization in this way we can overcome that and get better prices, and that is what we are all working for; that is, the money there is in it.

*Mr. President:* This same association says on grading of fruit, that all the fruit which passed through it was graded before drying. A few of the advantages of this system is that it is cheaper, inasmuch as it obviates the necessity after drying. The same fruit is worth more if graded than if not graded.

*Mr. Shepard:* I stated that in my opinion there would be about a million and a quarter pounds of fruit dried in these two counties. Five hundred acres producing a bushel to the tree, 125 bearing trees to the acre, and I think that is a low estimate, will produce 20 pounds to the bushel; will produce a million and a quarter pounds; that means  $62\frac{1}{2}$  carloads, 20,000 pounds to the carload. In my own section, in the northwest quarter of Polk, I think there will be about 50,000 pounds. Here, one gentleman told me he would have about 30,000 pounds. Another, Mr. Clark, will have about 60,000 pounds. Another gentleman farther out ought to have 70,000 pounds. I found it profitable to cooperate in a very small way with two or three of my neighbors in pooling our wheat. Much more so will it prove in the market of our fruits. We don't realize that there will be  $62\frac{1}{2}$  carloads to market next fall. I don't think any one conceives how rapidly this is going to grow on us. There is going to be, as our President said yesterday in his address, thousands and thousands of wagons coming into this city laden with fruit. The hop industry is going to make it very lively too, but the fruit industry is growing more rapidly. The great majority of our orchards are not bearing at all. Consequently, before we know it, there is going to be conditions which we are not able to compete with without organization. I certainly think that I made myself plain. You may not have noticed it, the great advantage in economy. Instead of having the buyers come to me and dickering for my fruit and telling me, "I can beat that; I have bought such a person's at that price," and I am in need of money, and I let it go. Instead of that, our secretary or our president goes right to the managers of two dozen firms, it is limited to that number, that buy by the train load. Mr. Farrar told us this morning that marketing through middlemen was obsolete. Let one man go there and say, "We can put ten carloads on the track whenever you want them." They will be glad to meet you. But if I go there with my five tons and my neighbor goes

there with his five tons, supposing we happen to meet there in Chicago, and we each make known our business, we would be regarded as having escaped from the insane asylum, to let two men go there when one might have done. He won't give us as much. He says, "I don't know but what I will find five different brands, whereas I must protect myself." Whereas if I could say, "Here is the sample; twenty carloads of one brand." He wants that; he will pay the best price; he has his salesmen out and he wants to send them samples. Supposing there is no organization, we all know we ought to grade our fruit; everybody should try and get around to it this season. I look up advertisements of graders and I send for one that I think I would like; my neighbor sends for a grader from a different factory; come to find out mine don't just fit the others; don't give the same number of grades. Another thing, I don't know what I ought to put my fruit in, whether to put in bags or boxes. I am told that in California they are shipping in bags, sacks, altogether to send abroad. Certainly as our President suggested, our lower grades must be put in bags; to put 25 pounds of lumber around five pounds of fruit don't pay.

*Mr. Beatty:* I would like to know what would be the probable cost of this institution, and this overseeing, etc., and cost of the organization, and how the organization can be effected?

*Mr. Shepard:* The cost I have given some little thought to, as each year comes with its increasing crop. This year it will be larger than any future year. I think that this year the cost will be less than a quarter of a cent a pound, and I think, as I have before suggested, we may safely say a cent a pound premium on our fruit, making three quarters of a cent saving. If we did nothing but effect an organization that would pay us for another crop; I think that it would pay us enough to test it. As to how to effect an organization. The Secretary could be instructed to issue a call in the name of this association for fruit-growers to meet early in May for the purpose of effecting a fruit-growers' union. Now, that must be independent of this association. This is for discussion, theoretical work, and so on; this association would simply issue a call for that; the matter must be thoroughly canvassed in the papers, and all the fruit-growers interested as to the object of this meeting, and with officers for the proper transaction of business, and appoint a committee, I should say residents as near as you can get of Salem, that is, for convenience. Salem is the head. Select good business men and fruit-growers here out of this number as an executive committee; I should say five would be enough; I think there is such an organization in California where they have an executive committee of five. Through this committee, then, the work would be

done. The Secretary would have to be a salaried officer; because if we are to save barrels of money by this means we must not be afraid to send out quarts of it.

*Professor Smith:* I want to talk a little on organization. There are a great many little difficulties I think in the way, and it is well to have the pro and con of this affair. Suppose this committee is to come to my farm and say, "Your fruit is not good enough; it can't come into the association, although you are a member." I may think perhaps their judgment a little biased, and think that I could do well with my fruit. Now we must have confidence. It is not likely that three, or four, or five, whatever number of men they might choose, that they would have any design upon an individual. Now, if I got to thinking, I would think it would be more of my own fault than anything else. I might be jealous. Suppose I should object from the judgment of that committee; could I come before the association, bring a sample, and have everybody look at it? Then I can see another, with interest to the growers. Different kinds of dryers will dry fruit different. You have one that is drying by heat, and another by steam, and then some one will have a dryer that he says is the only one that will do to dry fruit with. Now, would the first be obliged to use this same kind of dryer? You say you have a number use the same kind of dryer.

*Mr. President:* Isn't it true that all prunes are now dried by hot air?

*Professor Smith:* No; they have a steam dryer.

*Mr. Shepard:* The ordinary steam dryers dry I think precisely as furnace dryers. I have seen them where the juices can be made to drop right out and leave your fruit just the same as a furnace dryer. Supposing the committee visits your place and you are not satisfied, you could have an auxiliary committee of five. If this auxiliary committee should decide against it, you would be satisfied.

*Mr. Jory:* In steam dryers which I have seen, the steam is used to generate hot air.

*Mr. President:* In case this committee didn't pass your fruit through this organization, you would be just as well off as you are now. You could sell it yourself. Seems to me that this fruit could be hauled to a wholesale warehouse instead of having a committee visit each orchard, where, if it was necessary, it could be regraded and then repacked.

## HOW SHALL WE MARKET OUR FRUITS?

By JAMES R. SHEPARD.

The evolution of the fruit industry in the Willamette Valley has forced upon us the consideration of a subject that would have been premature heretofore. Six or eight years ago, the topics for discussion most in favor with a gathering of this kind, were, "What varieties shall we set out?" "What soils are best adapted for fruits?" etc. Later, the varied questions relating to the care of orchards,—pruning, culture, tiling, pests, etc.,—presented themselves for discussion. These are all open questions still, and will ever remain open. But the time has arrived when a more important question than any heretofore discussed must be not merely talked over, but settled, and settled wisely, if our labors are to be rewarded. That question is, "How shall we market our fruit?"

Like problems usually solve themselves, but peculiar and unprecedented conditions exist that must be met by Oregon fruit-growers. We may be tempted to rely upon the superior merit of our products in our competition with California fruit-growers; but competition between superior merit only, on one hand, and experience, organization, precedence, wealth, and equipment on the other, is certain to result in victory for the latter. In California, the marketing of fruits has become systematized; organization and coöperation has gradually been introduced and Eastern trade relations established, until they now look forward to the marketing of many thousand carloads of dried prunes alone annually with perfect confidence. Santa Clara Valley expects to have 1,800 carloads this season, with but one half of their trees in bearing. We should immediately prepare to meet the conditions and demands of trade which they have leisurely created, before they have preëmpted the entire field, to the exclusion all new-comers.

An organization of all who expect to have dried prunes to market this coming season should be immediately effected, that the machinery for placing our products on the market to the best advantage may be set in motion in time for the fall crop. It is the height of folly for us to continue as heretofore, making consignments or selling to small dealers individually. That has up to this time been the only feasible way, for our orchards are just coming in bearing. But this season we will have, no doubt, a greatly increased yield,—the first large enough to draw the attention

of Eastern buyers. Let us estimate the crop of Marion and Polk Counties at one and a quarter millions of pounds—not an exorbitant estimate, I think. One cent per pound on this would amount to \$12,500. This sum would no doubt be saved to the grower by cooperation in selling. Not only is this sum to be saved, but the markets will be made, reputation established, methods studied, and valuable experience obtained for handling the enormous crops of the next few years, as only a small fraction of the trees set out are yet in bearing. The time is almost here when this valley will have from forty to fifty millions of pounds of dried prunes to sell annually, to say nothing of other fruits.

But how shall we organize, and what can we do when organized? Let us suppose that a score or more interested persons meet and organize, and elect an executive committee of, say five, trusted, experienced men. This committee could purchase all supplies requiring uniformity, such as graders, boxes or bags, labels, etc., at wholesale prices. When the season arrived for packing fruit (bear in mind, I am speaking with reference to dried prunes only), this committee should make a tour of their district, examine fruit, and, if properly cured and graded, furnish the association label, which would be a guarantee of uniform grades and first-class stock. Thus the entire product would be as uniform as though from one factory. Individual names could be added in a small card on the association's label, if desired; but my idea is, that the effort should be made to sink the individual prune-grower almost as far out of sight as is the individual wheat-grower. Through the Board's Secretary, the members would keep posted on methods, markets, etc., and through the Board all sales would be made. Eastern dealers would quickly learn that each brand in the district was true to name, and that they could rely upon its being first-class of that brand. Instead of their sending a score of buyers, under heavy expense, dickering for individual lots, giving misleading information, and bearing the market at every turn, one member of the Board could visit every Eastern house that buys in quantities large enough to warrant our attention. (I am only giving you a few of my own ideas along this line, which may not bear in all particulars mature consideration.) A moment's reflection will convince you that the best of reasons would exist for the production of only first-class stock of each kind, for labels would be furnished to none other. Poor fruit would then have to hunt its own market. The reputation of Willamette Valley prunes would be established. Without organization, poor lots would come into competition with good, and buyers would be suspicious. An occasional large producer would secure recognition for his brand, but at most he could

not hope to supply the demand of even one large firm, and would be handicapped by his limited shipments. Economy at every point will be absolutely necessary in a few years, and to this end shipments must then be made in train-loads.

Lack of confidence in one another is the only obstacle, I fear, that will be difficult to overcome. It is one of the few traits in the average agriculturist's makeup that I blush to acknowledge. But, perhaps, as *horticulturists*, we will manifest a more intelligent spirit, and recognize the inevitable. There are other obstacles to meet, but I believe they can all be overcome. From the foregoing, let me summarize the advantages of coöperation in marketing:—

1. We would meet organized competition with organization.
2. Better prices, less expenses.
3. Uniformity in grades, quality, and brand.
4. A national reputation for our brand.
5. A trustworthy bureau of information.
6. Economy in buying boxes and other supplies.
7. Encouragement to produce only first-class stock.
8. The concentration of energy in channels already well defined and deeply worn.
9. Saving of the omnipresent middleman's profit.
10. The avoidance of a foolish and ruinous competition among ourselves, hurtful to the largest growers and disastrous to the smaller.
11. The machinery, knowledge, and confidence necessary for the application of the principle to our green and canned fruits in the near future.
12. The salvation of the Oregon fruit-grower.

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## ADDRESS ON DRAINAGE.

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Delivered before the Marion County Horticultural Society, Salem, Oregon, by JOHN M. BLOSS, President State Agricultural College, and Director of Station.

During the past week, I was asked by your president to talk to you on the subject of drainage. It is a subject in which I am deeply interested, and one in which I feel the people of this valley ought to be greatly interested.

I suppose, from what I have heard from those who came to this country in the early fifties, that a large portion of the soil was then in the same mechanical condition as that which now may be seen, where it has neither been cultivated nor tramped by horses and

cattle. The soil was then very loose, and old citizens have told me—and I have no doubt about the truth of the statement—that they could push a walking-cane down into the ground two or three feet without any particular effort.

That today you could not do. There has been a change come over the mechanical properties of the soil—a change not due to the climate—the climate is all right—but a change that is due to your methods of treating the soil. You have plowed the soil when it was wet, sometimes the water followed you in the furrow, protesting, as it were, for being disturbed. You expected the rain to continue, but it did not. Then came dry weather, and the sun baked the soil. This has been repeated for years. You also pastured your lands when the ground was wet and soft, and your horses and cattle puddled the whole surface. Thus the mechanical conditions of your soil has been changed since 1850.

I know that imagination has much to do with our ideas of the past. For instance, the hills do not look so high to me in my old home as they once did; the spring is not so far away from the old house as when I carried the water. But making due allowance for all the freaks of imagination, it is doubtless true that your crops were better, that your peach and apple trees grew more thriftily and produced better, and that your wheat and oats made a greater yield then than now.

It is doubtless true that even in the fifties the soil needed underdrainage; but in consequence of its looseness the water rapidly sank out of sight and more readily escaped into brooks and rivers. This it can no longer do, because the soil has been baked and puddled until it is in many places almost impervious to water. Hence, if drainage was needed in the fifties, there is that much the more need for it now, and every additional year only adds to this necessity.

As I travel over this valley I see but little land that would not be greatly improved by underdrainage. I have seen none that did not need it. I have no doubt that there may be some such favored spot somewhere in the valley. Let me describe it. It is probably in some river bottom; the surface is from ten to twenty feet above the ordinary stage of the water; the surface soil is a sandy loam of considerable depth, resting on a bed of gravel. Here the rain quickly soaks down through the loam and escapes through the gravel. If, however, there is a layer of tough clay between the loam and the gravel, the clay becomes, as it were, a bottom to the bucket and prevents the escape of the water. We call the result a marsh.



## PURPOSES OF DRAINAGE.

Let us now see what the purpose of drainage is. It will be the same whether for the prune orchard or the wheat field.

All the products of the horticulturist and the agriculturist are air plants,—that is, they grow in the air; the roots as well as the tops must be in the air. Of course, the roots may frequently be bathed in water, but they cannot live for a great length of time in water, or under it. The main roots of the wheat will, under favorable circumstances, extend down to a depth of four or five feet; the same is true of timothy and clover. If you have any doubt about this, dig down by the side of a wheat plant two or three feet, then with a hose gently wash away the soil, and you will find what I have stated to be true. The same is true of your prune and apple trees. This can only happen, however, where the conditions are favorable.

The water-table is a term used to express the level at which the water stands in the soil. During a portion of the year, the water-table in this valley is almost if not at the surface of the soil. In places, it may be a few inches, and in others a foot below the surface. In many of the wheat fields which I have seen along the railroad, the land has been thrown up into narrow ridges, and in the furrows between the ridges the water has been standing practically all winter. The water-table in that case would seem to be on a level with the bottom of the ditches between the ridges of land. If you will carefully examine such a field, you will discover that the wheat on the soil farthest above the water-table (in the middle of the land) is the most healthful, and that the nearer you approach the water-table the more weak and sickly is the plant. There is no accident about this. If you would examine the roots of these plants, you would find that the main roots had been drowned by long continuance in the water, and that the plants are now holding on to life simply by the lateral roots, and that those nearest the water-table had but little surface left for lateral roots. These plants show their condition by the yellow color.

That which is true of the wheat plant is equally true of the apple, plum, prune, and peach. The roots of these trees cannot live for four, five, or six months under water. To satisfy yourselves of this, examine the rootlets that have pushed themselves down into the soil during the dry season, after they have been immersed for months, and you will find that these rootlets are practically dead, and in many instances that the external covering readily slips from the woody part of the rootlet. Under these conditions, the plant or tree must necessarily lose its vigor and become diseased, because it has lost the power of resistance.

If you wish to determine the depth of the water-table on your lands, make an opening in the soil 18 inches square, and 30 to 40 inches deep. Place the soil removed about the opening so as to prevent the surface water from entering. The depth to the surface of the water in such an opening will be the depth of the water-table below the surface, because the water will never rise higher in such an opening than in the neighboring soil. In fact, the water will always be a little higher in the adjacent soil than in this opening. If the land be sandy loam it will be but slightly higher, but in fine clayey soils it may be much higher on account of greater capillary attraction. In properly drained lands the water ought not to stand in such an opening.

Where there is no drainage, and when for a long period the water-table lies within a foot of the surface, the roots and rootlets, which during the dry season extend below the water-table, are destroyed by the next rainy season. The effect is the same as if these rootlets were cut off at the same depth by shears. Thus the efforts of one season are destroyed before the next begins. Is it surprising that the tree, after a few years of stunted existence, should finally give up the unequal contest and die?

The purpose of underdrainage is to permanently lower the water-table to the depth of the tile. If the tiles are placed 40 inches below the surface, then the water-table will be 40 inches below the surface, provided the soil is not impervious to water, and the carrying away of the water from the surface, which acts like a roof on your house, will even extend the depth of the water-table so that it will be more than 40 inches.

Let us suppose that the proper amount of tile has been placed in the lands, and that these tile are properly laid, what must now take place in order that they thoroughly drain the ground? First, the soil when examined under a microscope, will be found to be made up of separate particles with an interstice between them. These interstices in properly drained soil ought to be filled with air, but in undrained soil they are filled with water. These interstices form, as it were, a series of tubes. In that part of the soil immediately over the tiles referred to above, the water sinks rapidly by gravity to the tile below and is carried away; but as the interstices referred to above are all connected, the water on either side of the drained portion would be forced into this portion by gravity. This would account for the drainage immediately over and near the tile.

I said that the water-table would in time be almost on a level with the tile. Let us see for a moment how this is accomplished. If the tile be only partly full of water, then the water on either side of the tile would find itself unsupported on that side, and would

find its way into the tile. In this way we should soon observe that little channels were being cut back from the tile on the plane of the water-table. At first, these channels would be very short, only a few inches in length, but by constant use these little channels, containing little streamlets, increase in size and gradually extend farther and farther back from the tile.

This affords me an opportunity to express some words of caution. Don't expect too much from your tile the first year. The water *must get into the habit*, as it were, of going into the tile and thus escaping. There must be time given for these little channels to extend laterally away from the tile. The first year they may not extend more than five or six feet on either side of the tile, and hence only that much—a strip ten or twelve feet wide—will be drained. The next year these channels will be lengthened, and so the next, so that at the end of the seventh year your tile ought to work better and drain the ground more perfectly than the first year. You will be surprised at the amount of very fine sand that escapes from the outlet of your tile drains. This sand comes from the extension of the little channels which have been cut back from the tile on the water-table. This all takes time as was said before, hence you must be patient while the water and gravity are helping you to finish the work of drainage.

It is frequently asked how does the water get into the tile. Well, it rises up on the underside between the ends of the tile. It could only go down through the top of the tile while the whole is covered with water. The water all goes into the tiles at the ends of the sections. It does not soak through the body of the tile. Avoid the agent who wants to sell you porous tile. You don't want that kind of tile; the harder it is burned the better.

Suppose now that you have tiled your lands and removed the permanent water-table 40 inches below the surface, and suppose that by so doing you have lowered this water-table 30 inches; then you have practically opened up to use 30 inches of soil that before was unused, because until the air could circulate freely through the soil no chemical changes could be made, and no food for plants could have been prepared in it. Hence, when you drain your prune orchards you increase the possibilities for their growth, and the old orchard which has practically used up all the valuable material near the surface now gets a new lease on life in this new soil.

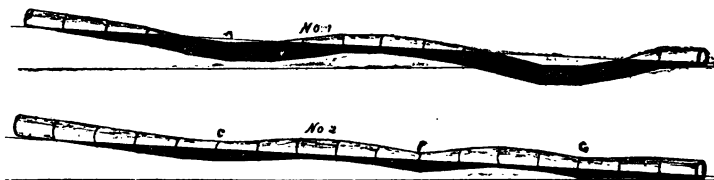
The changed mechanical condition of this permanently drained soil soon begins to show itself. The first year as you plow across the lines of the tile drains, you can readily tell where the drains are located by the lightening of the draft on the team, and the friability of the soil. This condition is really more marked in the

tough clayey lands than in black loams. The texture of the clayey particles is finer and the interstices smaller than in the sandy loam. The clayey soil holds more water than the loam, because the interstices, although smaller, are far more numerous. This, however, only makes the necessity for drainage that much the more important. In the clayey lands the tiles must be closer together than in the loams for reasons indicated above.

It is frequently asked how close must the tile be placed. That question I cannot answer; there is no rule that can be followed. In clayey ground the tile must be closer, say from 16 to 20 feet, while in certain loams equally good drainage may be secured at 40 to 50 feet apart.

The next question which may arise is the size of the tile to be used. This depends, first, on the method used in laying the tile; and second, on the fall or grade.

First, if the tile is laid by guess, or by a water level, or rather by observing the flow of the water in the ditch, then you would better use a six-inch tile where a three-inch tile would be abundant on a perfect grade, because the grade line will have many inequalities in it; and you must make an allowance for the parts below grade to be filled up with silt. If these inequalities, *up and down*, be less than six inches, then some water will continue to flow from a six-inch tile, as in figure No. 2 below.



Figures Nos. 1 and 2 represent tile laid on an imperfect grade. The dark portion represents the silt which has collected in points below the grade line. The light, that part not filled.

In No. 1, the tile is choked with silt at A, and is useless.

In No. 2, the tile is partly filled at C, F, and G, and its capacity has been limited to that of the narrowest point, as at F.

The probabilities are, that the inequalities will be more than three inches, and that the tile so laid will in a few years be entirely filled with silt, and cease to be of any use, as shown in figure No. 1 above. However, great the care taken in laying tile, there are liable to be slight inequalities. These should, however, be reduced to the minimum. Where there are not more than two inches fall in one hundred feet, and where we have nothing better than the eye to determine it, it is very easy to go from two to three inches below the true grade line without discovering it. This would cause a three-inch tile to be strangled, and hence useless. If

tile are properly laid on a grade of one inch to one hundred feet, it will be sufficient, in most soils. Such a grade is over four feet to the mile, which is greater than the fall in many of our rivers. For this reason, I would never recommend tile to be laid by a water level. If a man were to offer to furnish the tile and lay them for nothing, and I had no immediate use for the land, I think that I would let him put them in; but I certainly could not afford to pay for it.

I would have the tile put in on as perfect a grade as possible,—first, because it would cost but little more to do the work, possibly not so much; and second, the tile that I would then need to use would not be more than half the size otherwise needed. The cost of the tile depends on the size. Thus: three-inch, about 18 cents per rod; four-inch, 25 cents per rod; five-inch, 35 cents per rod; six-inch, 50 cents per rod; seven-inch, 70 cents per rod; eight-inch, 90 cents per rod; ten-inch, \$1.20 per rod. Now, if a three-inch tile properly laid could be used where a six-inch tile must be used under the other methods, then it would be much cheaper to lay the tile on a perfect grade.

To estimate the size of the tile, the amount of water to be carried away in any one day must be known. A ten-inch tile on a grade of three inches to the hundred feet will carry in twenty-four hours water to the depth of one inch over an area of sixty acres. The amount of water on the surface of one acre when one inch deep weighs about one hundred and twelve tons. Hence a ten-inch tile would carry at that grade about six thousand seven hundred and twenty tons in twenty-four hours. A three-inch tile would carry on the same grade an equal amount of water from three acres, or three hundred and thirty-six tons. But we can rarely ever get a three-inch tile long enough at a grade of three inches to one hundred feet to keep itself filled with water for twenty-four hours. The water can't get to it fast enough. By an experiment which I made, I found that a three-inch tile at a grade of two inches in one hundred feet had to be extended to a length of seven hundred feet before it would run full of water, when the soil was saturated. At a grade of three inches to the one hundred feet, it is probable that the tile could be extended to one thousand two hundred feet. If the three-inch tile runs just full of water, then it carries all the water that would be carried by a six-inch tile in the same place, because it carries all the water that can reach a tile at that point. Hence a larger tile would be useless.

When the soil has been properly tilled to the depth of 40 inches, then the water-table, as has been said, has been lowered to almost that depth. The interstices between the particles of the soil are now filled with air, and when the rain comes it readily passes

down into the ground, forces the air out, and saturates the soil. If one inch of water were to fall in twenty-four hours, it would saturate the soil to a depth of about 30 inches, and unless the rain fell very suddenly it would all be absorbed. The rain water contains a large amount of carbonic acid gas,—a very necessary plant food,—which is left in the soil, while the water escapes through the little channels on the water-table to the tile drains. Within the next twenty-four hours this water is carried away, and leaves the soil ready for the next water-bath. In the meantime, the air has followed up the water as it passed toward the water-table, carrying with it its heat, imparting it to the soil, and helping, at the same time, to work those chemical changes which stimulate growth.

In addition to the changes in the mechanical condition of the soil, thorough drainage does another important thing: it raises the temperature of the soil during the rainy season,—winter and spring,—and makes the soil more moist during the dry season. These are conditions certainly greatly desired by every farmer.

In underdrained lands, there are but three ways for the water to escape,—first, to pass through the soil and sub-soil; secondly, to flow away over the surface of the soil; and thirdly, to evaporate and escape by means of the air. Only a very small portion of the rain which falls in this valley can escape through the soil and sub-soil. Hence the greater part must escape either by overflow or evaporation.

When your head aches, you bathe your forehead with ether; this quickly evaporates and carries away from your temples the excess of heat. Let it evaporate from your hand, and you feel that your hand is colder. The evaporation of the water from the surface of the soil has the same effect on the soil and the plants—it lowers the temperature of the soil and chills the plants. The rapidity of growth of any plant depends upon moisture and warmth. Properly drained land is, therefore, warmer than the undrained—first, because the amount of evaporation is lessened; and second, that which is just as important, the air circulates through the soil down to the water-table, and gives up to the soil its extra heat.

During the dry season, the air circulates freely through well drained lands, because it is friable; and as the soil is colder than the air it causes a condensation of the moisture in these currents of air which makes the soil moist. All know that the more thoroughly pulverized the soil, the better it withstands drought. By proper drainage fifteen days may easily be gained in the spring, and the fall may be extended an equal time. Thus, a month may be gained for maturing various crops.

Some one usually asks during these talks on drainage what about the road? Well, if you will drain your farm and make an Eden of

it, you will then have something to make roads for and with. If you will tile drain your roads to the depth of 40 inches,—placing a tile on each side of the roadway,—raising the center of the road so that the water will run off, you will have ordinarily good roads, and especially is this true if you drain the lands on either side of the road. No energetic community need have bad roads in this country, nor does a town or city need to have muddy streets,—don't wait for sewerage, that will come later, but tile-drain your streets and grounds.

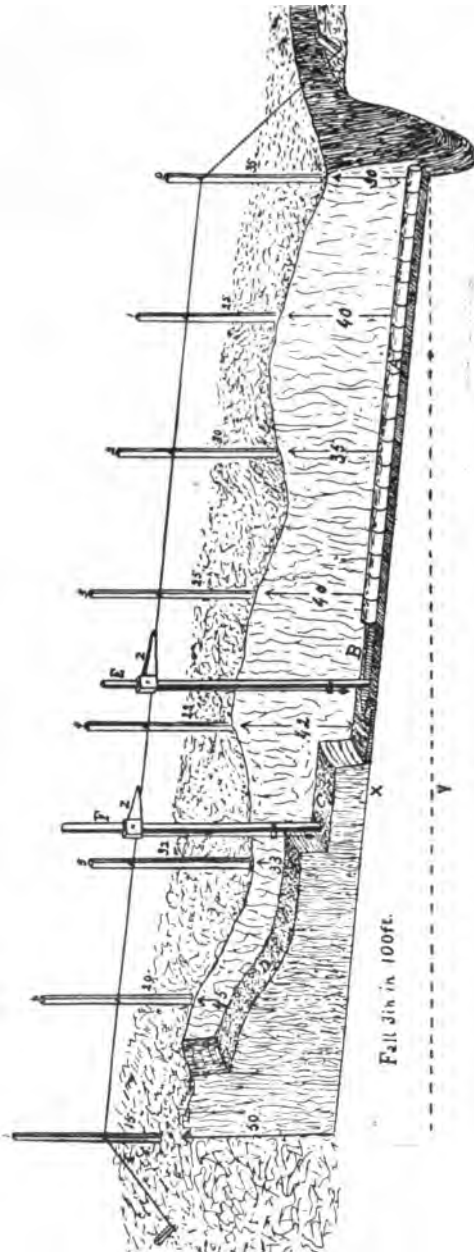
#### METHOD OF LAYING TILE.

In order to properly underdrain your farm there should first be a carefully prepared plan; it would be better to make out a complete map, drawn to some scale, say one inch to the hundred feet. The first thing to be secured is a proper outlet; second, the position of the mains which are to carry the water away,—the size of these must be adapted to the amount of water to be carried; and third, the lateral drains. I would suggest that you stake out these mains and laterals just as you wish the drainage to be when fully completed. Drive a good stake 18 inches long down into the ground until the top is even with the surface of the soil; this is the grade stake. By the side of it drive in a stake two feet in length and leave one foot exposed; this is the station stake. These stakes should not be more than 25 feet apart. When this is done get an engineer, if you are not one, and have a complete survey made of your lands.

If your plan shows that the laterals are to be 20 feet apart and you are not able to do all the work in one season, then put in the mains and put in lateral drains 80 feet apart; the next year make the laterals 40 feet apart, and the next year put in twice as much tile and make them 20 feet apart. The same grade stakes will remain through that period.

The engineer will give you the depth of the tile at each stake or station, and, if competent, can you tell the size of the tile to be used. This will cost something, but when you have once prepared for the work it will take him but a short time to level and make the calculation for a thousand rods of tile. If this is properly done it will save many times its cost. We speak of houses and farms as being permanent improvements, but really the tile drainage will be the only permanent improvement that you will ever put on your lands. A thousand years hence, if it has been well done, it will still be new. Hence it should be well done.

The following device, illustrated in the cut on the succeeding page, is the best means that I have found for securing a perfect grade in laying tile without an engineer to test the work as it is completed.



Here it will be observed that there are eight stations. The survey shows the depths at each grade stake as follows:—

Station 0.....	30 inches
Station 1.....	40 inches
Station 2.....	35 inches
Station 3.....	40 inches
Station 4.....	42 inches
Station 5.....	33 inches
Station 6.....	45 inches
Station 7.....	60 inches

At the side of the grade stake stakes about four feet in length are driven into the ground which have the station marked above them. On the side of these stakes is a hook. The first stake at *O* is driven into the ground until the hook is just 35 inches above the grade stake. This makes the bottom of the tile just 65 inches below the hook. The second is driven into the ground until the hook is just 25 inches above the grade stake, making the bottom of the tile just 65 inches below the hook. The other stakes, it will be observed, have each been driven into the ground until the hook is just 65 inches above the bottom of the tile. Then a wire (a fine steel wire of the kind used for holding stovepipes in place) is stretched very taught on the ground between the two inclined stakes, and when fastened, it is then lifted into the hooks on



the stakes. This wire must be, if the survey is correct, a straight line and parallel with the bottom of the ditch and just 65 inches above it. This wire is on one side of the ditch but not over it.

In the preceding illustration the line Y is a level or horizontal line, the line X is the grade line, and the space between these lines indicates the fall.

The difficulty in constructing a ditch for a tile drain, on a grade, may be seen in the cut on the preceding page. The upright stakes are 25 feet apart, but it will be observed that a different depth is required at each point. The tendency is to make the ditch at all points about the same depth below the surface. In that case the bottom of the ditch would be parallel with the surface. Thus, in the illustration, the first cut, the depth of one spade,—about 15 inches—will have a bottom parallel with the surface of the soil as seen at D. The second may be made in the same way, provided it does not reach the grade of the tile. In the illustration the bottom of the second cut at C is placed on a grade parallel with the line X by means of the measure at F. The third cut is made in the same way, but is made so that it lacks about  $1\frac{1}{2}$  inches of being to the grade at which the tile is laid, as indicated in the figure. Then with the bottoming tool, or spoon, the bed for the tile is cut out carefully until the grade line is reached. This will be determined by the measure indicated at E. These measures are constructed as follows: The upright piece is six feet long, and  $2\frac{1}{2} \times \frac{3}{4}$  inches; this is laid off in inches; attached to the upright is a movable arm Z, about 18 inches in length, having a thumb-screw for fastening it at any point on the upright; this arm is fastened at right angles; a plumb is attached to one end of the movable arm. The movable arm in this case is fastened just 65 inches from the bottom of the upright; hence, when the measure is placed vertically on the bottom, if the grade line has been reached, the arm ought to touch the wire. In this way the bottom on which the tile rests may be made a perfect grade and parallel with the wire.

It is important that the tile be placed in soil which has not been disturbed, that the alignment may not be affected by the tile settling. The tile should be laid so that the ends are brought as close together as possible, and so that the tube will be continuous.

By the method above indicated short lines of tile may be laid on a perfect grade without any survey being made, by first determining the depth of the ditch at each end, and then adjusting the wire an equal distance above each and in a straight line between these points. The height of the wire above the surface of the soil is immaterial, but it must be placed parallel with the grade on which the tile is to rest.

Those who are interested in the subject of drainage will find much of interest in works devoted to that subject by such authors as French, Manly, Miles, Kilpart, and Warring.

## SMALL FRUITS.

Address by E. HOFER, editor of the *Capital Journal*, Salem, Oregon.

It is impossible to estimate the amount of small fruits that can be produced off an acre, or an ordinary town lot. It is agriculture in its most condensed form. Flowers have been known to yield thousands of dollars off a single acre; but we cannot consume them, and unless we are near a wealthy, large city we cannot sell them. Small fruits can be sold anywhere,—even in the country,—and they can be eaten anywhere, in season and out of season, fresh, dried, canned, preserved, and jellied. This is nothing new, but it should impress us with the universal demand for these acid treasures of the soil, so easily grown, produced from Florida to Alaska, yielding richly from all soils, under all suns and all temperatures, with care or neglect, wild or tame. How can we estimate the richness of God's blessings in scattering with lavish hand, from pole to pole, the multitude of small fruits that bedeck the earth? What debt do we not owe the Creator of nature's resources placed at our commands, and the capacity given us to appreciate and enjoy them! Next the Almighty, we owe a great debt to horticultural societies and nurserymen; and even to the peddling agent, with his book of gaudy illustrations, which is bringing the sublime in close proximity to the ridiculous, though if he swindle us into trying some humbug nine times out of ten, if we get a good thing the tenth time, we are richly rewarded; and we must remember, that with the highly illustrated catalogue and the glittering advertisement, the peregrinating peddler buncoes thousands of people in every county in Oregon into experimenting with new strawberries, raspberries, and Russian mulberries, who but for the illusive hope of getting something wonderful or something for nothing would never invest in progress of any sort. We are indebted to these organizations and commercial enterprises for the fact that so many people now have small fruits, and we may confidently expect that if there is no legislation against the tree peddler, he will do more to advance horticulture than all other agencies combined, excepting always our State colleges, societies, and local horticultural organizations, for without them there would be no scientific progress possible.

I am not prepared to give advice as to varieties to plant or methods of cultivation. Our soils are so productive, the variety of small fruits we can grow so unlimited,—in fact, almost anybody can grow anything in the line of small fruits if they possess a minimum of intelligence, industry, or enterprise, so far are they from the calamities that befall large fruits,—that I will leave kind and culture to that horse-sense possessed by Americans in common, whether employed in raising gooseberries or governing Alaskans or Sandwich Islanders.

Horticulture is transforming Oregon from vast cattle ranches, horse ranges, and sheep forage to small fruit farms. In riding through Marion County I once saw an old lady standing out in front of her cabin keeping the wasps off a large tray of split plums with a fan of fern, while they slowly dried in the sun. She represented Oregon of old. A little further along was a bright new house, a busy family, the boys bringing in fruits of different kinds from various parts of the lot, the girls slicing, paring, preparing, and running the fruit evaporators, the father making and labelling packages, and the mother sitting in her rocking chair on the front porch reading the newspaper. That was new Oregon.

Every family that has any fruits, especially small fruits, should establish as part of the family economy the drying of fruit. Every farm of any size should have its evaporator and dry all fruit not marketable in a fresh state. It will employ all the family, young and old, male and female. You can get books and reports and post yourself until you are a scientific expert at the business, but you need not be a scientist to handle small fruit. Get your dryer and go to work. The man who sells it to you will tell you all he knows about it, and his information is apt to be valuable, as his business depends upon his knowing what he is talking about and being able to demonstrate it. Your neighbors who have dried fruit can tell you more, and you can learn the rest, and you may as well set out to do that for that is the only way to be sure of anything anyhow. There is an intimate relation between small fruits and a highly developed state of civilized family life. The health of young and old, the employment of male and female members, the independence and self-supporting ability of the family, the education, intelligence, and morality of the family can be measured to a great extent by its production and consumption of small fruits.

#### SMALL FRUIT PROVERBS.

Cultivate small fruits; they are God's manna for the millions.

The greatest men have grown small fruits. The small and the lazy men never do.

The small fruit in the market is at the bottom of the box.

There is no home lot too small to have small fruits. There is none too large. What is home without small fruits, say from one year old and upwards, in the dried state?

There is no off-year in small fruits; so great is the variety, it won't permit.

Fruit-growers, lay up your treasure where the codlin moth doth not corrupt, where rust and fungus do not come, and thieves do not break through and steal. Let your main reliance be small fruits.

At twenty-five cents a gallon for sugar and tin cans, there is no food value equal to canned small fruits. Glucose syrup at forty cents a gallon is nowhere.

#### ANOTHER SMALL FRUIT.

Whether we have any or not, we are all interested in that most precious of all small fruits—the baby, its proper care and culture, the nurture and development of those sweet buds of promise, that can make our homes a heaven or go to the reform school. All horticulturists should love the kindergarten, for it is conducted on the principles of their own science—letting the gifts of God develop under favorable environment.

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The ladies of the Salem Floricultural Society took charge of the evening meeting, which was held at the Y. M. C. A. hall. There was a large attendance, and a programme consisting of vocal and instrumental music, recitations, and readings was carried out. The following paper was read by a member of the Floricultural Society, Mrs. A. F. Hofer, which closed the fruit-growers' convention.

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## FLOWERS AND THE CHILDREN.

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Since the organization of a Floral Society in Salem the leading question among its members has been, "What line of work shall we adopt?" The field is a broad one, and only the most important features of it should be considered. The subject of floriculture is infinite, hence it is necessary to define our plans closely, and in order to accomplish results perhaps the best method would be to simply decide what not to do. Some of us have joined this infant Society possibly, in order to become walking encyclopædias on the subject of flowers and their culture. Others hope for great pleasure

from exchanging their modest stores of information on the subject. Some have no doubt joined in with the laudable idea of gaining renown for our city through this beautiful agency. Last, but not least, are those who would use this as a means to further inspire their children with a love for the beautiful in nature and all their surroundings. Each of these objects is in turn a worthy one, and we all hope to work out in this Society the salvation of our pet hobby.

As in all things the hope of the future lies in the children, we should not forget our duty towards them in this work. We should let them do a part of it, in the hope that at some future time they will develop our crude beginnings into an ideal society. How shall this be done is the question. First, let us take them into our work. There they will soon acquire our knowledge of the subject in hand and often give us valuable help and suggestions in return.

Who among us does not remember the time when we knew more concerning the flora of our neighborhood than our parents? This is as true now as in our youthful days, and this child knowledge should be stimulated and led on to more technical information. Let us take them into the meadows and the woods and teach them as well as learn what their better opportunities have taught them of the beauties of nature. About the home we should see to it that the children take a mutual interest in every plant and tree that we possess. It is not necessary to tax their little minds with the botanical names of each, yet from an early age children can be taught to classify the different families, as well as know the habits and requirements of each.

But more important than all this is for the child to learn early in life the perfections of nature and the beauty of its works. Do the man-made names and botanical appendages make the lily more pure or the violet more sweet? Let us rather keep the children free these bugbears and allow them to imbibe unconsciously the higher lessons taught by the blossoms so pure and simple. Show the child that a flower never bloomed that was not perfect in form and harmonious in color. They can be taught at one time the commercial and æsthetic value of flowers.

Let the children have seeds and plants of their own, no matter how small the garden plat, that their thoughts may work with nature and thus become as chaste and pure as her blossoms. Teach them the wonderfulness of the Creator through contact with His richest gifts. Let them learn that only by the aid of His light and power is it possible for us to have these beautiful surroundings to inspire us to nobler and higher impulses.

We all remember with joy the happiness of our childhood days,

and of gathering the flowers of the field. We knew to a day when the wild crocus would bloom, and the lapse of time between the appearance of the anemone and that of the violet. We needed no guide to direct us to the mossy beds and shady nooks to witness the uncurling of the delicate fern. From the opening of the first spring bud to the gathering of the harvest of nuts and mottled autumn leaves, can you recall a day spent in the fields and forests that was not one of purity and peace?

The recent observation of Arbor Day by the children of our schools, only leads to the higher suggestion of cultivating flowers about our public school building. This can be most successfully done, both indoors and out, with good effect, not only from the acquirement of knowledge by the children, but by the higher moral discipline involved. As the larger portion of the school year is during the winter months, the greater attention in this work should be applied to plants that can be successfully grown inside, as they can be made a great source of pleasure the year round. Our churchyards should have more flowers about them, all of which could easily be cared for by the children.

Let the young folks take part in the public exhibits, and see that their efforts are justly appreciated. They can exhibit wild flowers in bloom at the show season, or they can make an artistic botanical collection. Have them raise flowers with the idea of giving them away to make others happy. The inmates of our prisons and asylums, homes, and hospitals need their sympathy and good thoughts, as well as the gifts of their willing hands. Flowers are carried free by all express companies to these places, and when we stop to think how much pleasure and rest a suffering mind can find in a bouquet or a single blossom, we can only wonder why these things are left undone. Men who have unwillingly led dark lives need the uplifting influences that the beauty of flowers, the gift of children, must bring them. Let their cooling fragrance rest the feeble and the sick, and let the children's flower day be an event which will be looked forward to and be remembered by hundreds of unfortunate sufferers. Parents should especially foster in their children the spirit of cheerful giving, and this beautiful trait can in no way be so easily promoted as in the distribution of flowers.

It has been truthfully said that the teacher who can successfully implant in the children of the world a love for flowers or beauty in any form—that teacher will prove the evangelist who shall help to elevate the world for all time.

## HOUSE JOINT RESOLUTION NO. 9.

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Whereas the state board of horticulture, in its second biennial report to this legislative assembly, recommend and ask that—in view of the importance of some representation of our fruit interests at the World's Columbian exposition at Chicago in 1893—ten thousand copies of its second biennial report be printed and placed at its disposal for distribution at that exposition, and that ten thousand copies be printed and placed at its disposal for distribution among the fruit growers of this state, making in all twenty thousand copies; and whereas the said board caused to be published, at its own expense, an edition of ten thousand copies of its first biennial report, all of which edition was distributed among the fruit growers of this state, and in exchange with kindred boards throughout the United States, and which number was not sufficient to supply the demand upon the board for them; and whereas the second biennial report is replete with valuable information concerning the fruit-growing interests of the entire state, treating as it does, in a full and comprehensive manner, on the best methods of exterminating the various pests that now infest our orchards, also on the best methods of selecting, planting, cultivating, preparing, and marketing of fruits, and which information should be widely disseminated among the horticulturists and farmers of this state in the interests of this great and valuable commercial industry; therefore,

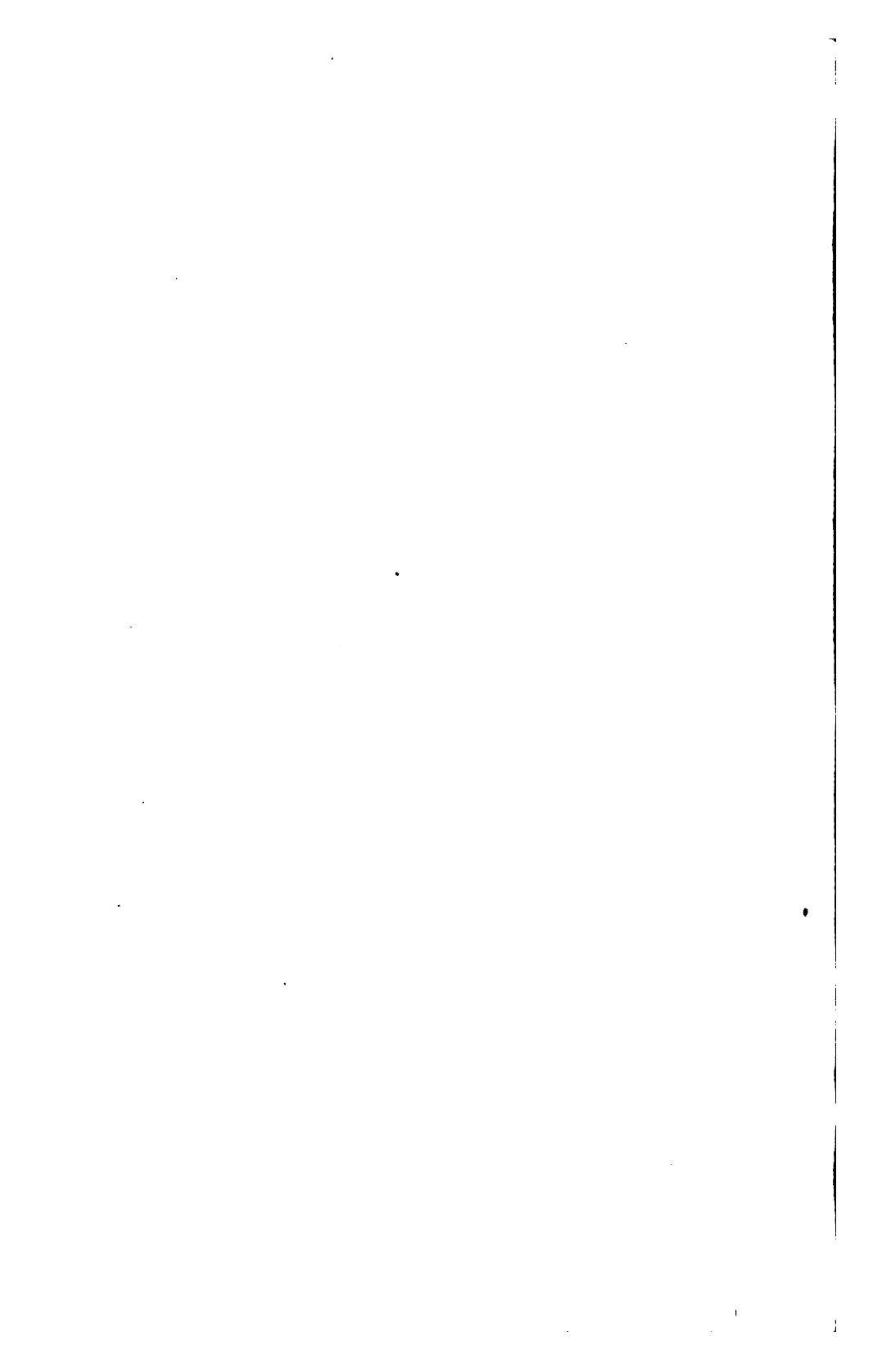
*Be it resolved by the House, the Senate concurring,* That the secretary of state be and is hereby required to furnish, at the earliest practicable moment, an edition of twenty-five thousand copies of the second biennial report of the said state board of horticulture, and to deliver to the secretary of said board all of said edition, with the exception of sufficient copies to meet the demand on him and the other departments of the state from people abroad, who are contemplating removal to Oregon, and who are continually applying to these departments for information relative to Oregon as a fruit-producing state; and which information is so well presented in the aforesaid reports.

Adopted by the house, January 24, 1893.

W. P. KEADY,  
Speaker of the house.

Concurred in by the senate, January 25, 1893.

C. W. FULTON,  
President of the senate.





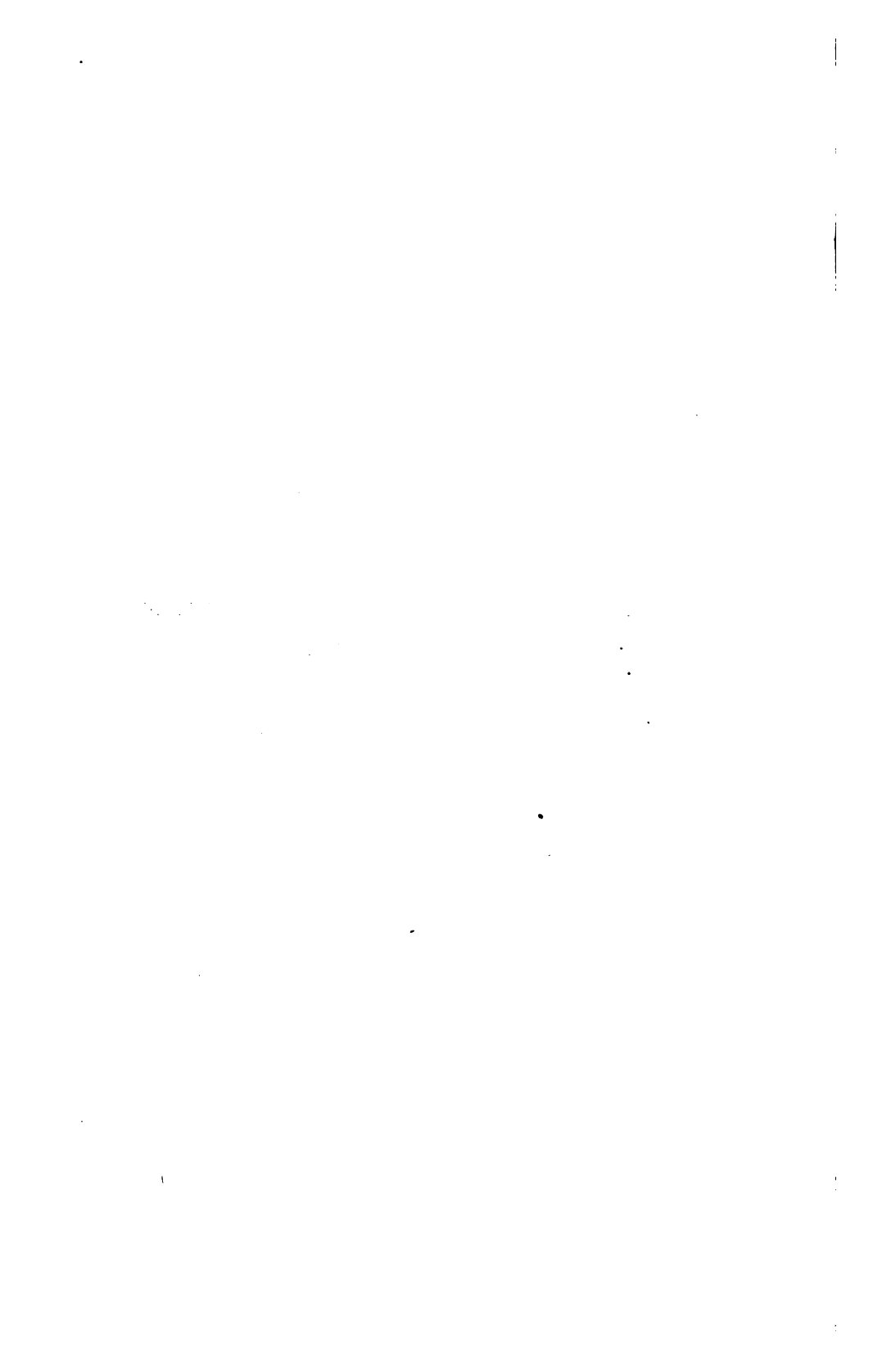
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# INDEX.

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# INDEX.

## A

	PAGE
ACKNOWLEDGMENTS.....	104
ACT, creating board.....	14
ALLEN, E. W., report of as secretary.....	66
papers by.....	149, 274
R. D., report of as commissioner.....	31
papers by.....	177, 218
ALMOND GROWING IN SOUTHERN OREGON. A. H. Carson.....	281
APHIS, green, remedies for.....	71
woolly, remedies for.....	33, 69, 86
APPENDICES.....	107, 297
APPLE.....	103, 268
tree borer.....	74
tree caterpillar.....	75
the, and its culture. E. H. Skinner.....	172

## B

BEATTY, F. J., papers of, on drainage.....	278
BERRIES. D. W. Coolidge.....	287
BOARD State Horticulture.....	2
BORDEAUX mixture.....	90
BORERS, apple, remedies for.....	74, 92
peach, remedies for.....	76
BLACK SPOT, or fungus, remedies for.....	34, 90
BULLETIN, of Board, No. 5.....	67
No. 6.....	88
No. 7.....	88

## C

CARDWELL, J. R., address State Horticultural Society.....	113
papers by.....	179, 250
report of, as commissioner.....	19
CARSON, A. H., papers by.....	160, 187, 216, 281
CATERPILLARS, remedies for.....	75
CERRIES.....	269
CODLIN MOTH.....	27, 57, 72, 91
COMSTOCK, PROF. J. H., paper by.....	245
CONDON, PROF. THOMAS, paper by.....	138
CONIFERS, our. Dr. J. R. Cardwell.....	179
CONSTITUTION, State Horticultural Society.....	109
COOLIDGE, D. W., paper by, on berries.....	287

	PAGE
COTTLE, H. W., address Fruit-Growers' Convention.....	299
CURRENT WORM, remedies for.....	79, 98

## D

DISCUSSION at the Fruit-Growers' Convention.....	305
DODD, A. H., paper by.....	175
DOESCH, H. E., report of, as commissioner.....	26
paper by.....	199
DRAINAGE, practical. F. J. Beatty.....	278
address on, John M. Bloss.....	325

## F

FAILING, W. S., report of, on new fruits.....	145
FLORICULTURE. Prof. E. R. Lake.....	221
FLOBISTS, amateur. Miss Maggie Ingles.....	239
FRUIT-GROWERS' CONVENTION, proceedings of.....	297
FRUITS, our new.....	145
production and markets.....	193
evaporating, science of. A. H. Carson.....	187
growing, early history of.....	96, 242
profits of.....	89, 102
industry, a review of.....	96
inspectors, reports of.....	58
FUNGOID DISEASES.....	89
FUNGOUS FOES. Prof. E. R. Lake.....	189
FLOWERS AND THE CHILDREN.....	328

## G

GRAPES.....	37
GRAPE CULTURE. J. H. Reese.....	237
growing. A. R. Shipley.....	202
GOOSEBERRY WORM.....	98
GREEN APHIS.....	71

## H

HAWLEY, A. T., paper by.....	285
HEALD, C. P., report of.....	44
HENDERSHOTT, JAS., report of.....	51
HENRY, JOHN, paper by.....	229
HORTICULTURE, failure of. Rev. D. E. Loveridge.....	280
in early days. Seth Lewelling.....	242
its past, present and future. E. W. Allen.....	149
some thoughts on. A. Rogers.....	233
HOW TO FIGHT INSECT PESTS. Prof. J. H. Comstock.....	245
HOW SHALL WE MARKET OUR FRUITS. James R. Shepard.....	323

## I

INDIGENOUS ORNAMENTAL PLANTS.....	206
INGLES, MISS MAGGIE, paper by.....	239
INSECTICIDES.....	67, 63, 86

	PAGE
INSECT PESTS, how to fight. Prof. J. H. Comstock.....	245
found in Oregon.....	67, 88, 88
INSPECTORS OF FRUIT PESTS, reports of.....	53
KEROSENE EMULSION.....	88

## L

LAKE, E. R., papers by.....	189, 221
LAW, creating board.....	14
LEWELLING, SETH, paper by.....	242
LONDON PURPLE.....	73
LOVERIDGE, REV. D. E., paper by, on the future of horticulture.....	280
LOWNSDALE, M. O., paper by, on orchard planting.....	167
LUCE, H. B., paper by, on orchard planting.....	267
LUNGS FOR THE SOIL. "Rural Northwest".....	256

## M

MARKETING FRUITS.....	156, 164, 198
MARKETS FOR NORTHWEST FRUITS.....	285
MILDEW, powdery.....	85
MILLER, HON. H. B., paper by.....	198
MILLS, DR. A., paper by, on spraying trees.....	248
MOTH, codlin, remedies for.....	27, 57, 78, 91

## N

NATIVE WILD FRUITS. J. R. Cardwell.....	22
NEW FRUITS. W. S. Failing.....	145
NEW HORTICULTURAL INDUSTRY. "Rural Northwest".....	205
NURSERY STATISTICS.....	96
NUT CULTURE. H. E. Dosch.....	199

## O

ORCHARD FENCES. R. D. Allen.....	213
planting. H. B. Luce.....	267
planting. M. O. Lownsdale.....	167
statistics.....	95
work. A. H. Carson.....	252
ORCHARDING AS IT IS, ETC. R. D. Allen.....	177
OREGON'S FUTURE IN FORESTS. E. H. Skinner.....	235
ORNAMENTAL PLANTS. Dr. J. B. Pilkington.....	208
OUR CONIFERS. Dr. J. R. Cardwell.....	179
OUR NEW FRUITS. W. S. Failing.....	145
OYSTER-SHELL BARK LOUSE.....	77

## P

PARASITES, valuable.....	48
PEACH CULTURE, ETC. M. Schuydecker.....	276
growing in Oregon. A. H. Carson.....	160
tree borer.....	76
yellows.....	228

	PAGE
PEAR, THE.....	103, 269
blight.....	45, 90
and Cherry-tree Slug.....	75
PERNICIOUS PRACTICE. "Rural Northwest".....	198
PERTINENT POINTS. Prof. F. L. Washburn.....	206
PILKINGTON, J. B., paper by.....	208
PLANTING, TREE.....	185, 267
PRUNE, THE. A. H. CARSON.....	216
gathering and evaporating.....	220
growing.....	101, 255, 269
profit of.....	59
PRUNE, a few notes on. A. H. DODD.....	175
methods of.....	36, 163, 218

## R

REESE, J. H., paper by.....	287
REPORT, to legislative assembly.....	7
of commissioner at large.....	19
of commissioner first district.....	26
of commissioner second district.....	31
of commissioner third district.....	41
of commissioner fourth district.....	44
of commissioner fifth district.....	51
of inspector fruit pests.....	53
of treasurer.....	63
of secretary.....	66
REVIEW OF THE FRUIT INDUSTRY.....	98
ROGERS, A., paper by.....	283
ROBIN AND LYE WASH.....	72

## S

SCALE, OYSTER-SHELL.....	77
San José.....	69, 84
SCHUYDECKER, M., paper by.....	276
SHAW, PROF. G. W., soils of Oregon.....	276
SHIPLEY, A. R., grape growing.....	262
SKINNER, E. H., paper by.....	172, 235
SLUG, pear and cherry tree.....	75
SOILS OF OREGON. Prof. G. W. Shaw.....	119
SOIL, types of Willamette valley. Prof. Thomas Condon.....	136
SPRAYING.....	27, 225
SPRAYING TREES. Dr. A. Mills.....	248
SMITH, E. P., paper by.....	225
STATISTICS, nursery.....	96
orchard.....	95
SUCCESS VS. FAILURE. R. D. Allen.....	177
SUMMER WASHES.....	88
SALT, LYE, AND SULPHUR WASH.....	85
SMALL FRUITS. E. Hofer.....	386

## T

	PAGE
TIME TO BEGIN PREPARATIONS.....	255
TREASURER'S REPORTS.....	63
TREE PLANTING.....	185

## V

VABNEY, J. A., report of.....	58
VEGETABLE GROWING IN OREGON.....	229

## W

WALLACE, R. S., death of.....	83
resolutions of respect.....	5
report as treasurer.....	63
WASHBURN, PROF. F. L., paper by.....	206
WASHES, summer.....	88
winter.....	86
WHALE-OIL SOAP.....	93
WHAT FRUITS ARE GROWN IN OREGON. E. W. Allen.....	274
WHITMAN, J. D., report of.....	41
WILD FRUITS, native. J. R. Cardwell.....	22
WOOLLY APHIS.....	83, 70, 85

## Y

YELLOWS IN PEACHES.....	228
-------------------------	-----